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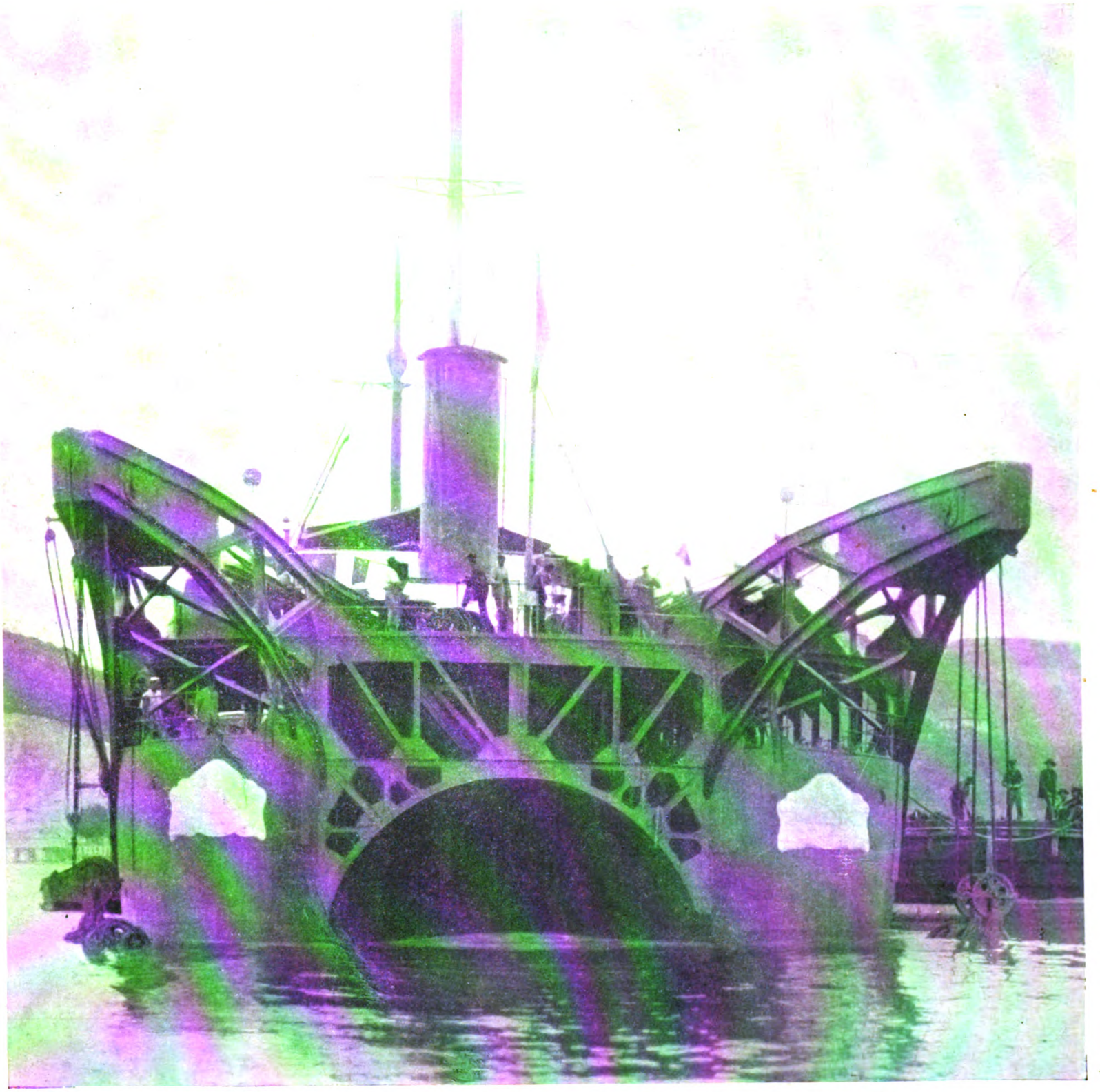
# MOTORSHIP



*Devoted to Commercial and Naval Motor Vessels*

Vol. 2 SEPTEMBER, 1917 No. 9
SEATTLE NEW YORK



SUBMARINE MOTHER SHIP "CAERA" (DIESEL ENGINED)

See Page 3 for Additional Views and Description

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# MOTORSHIP

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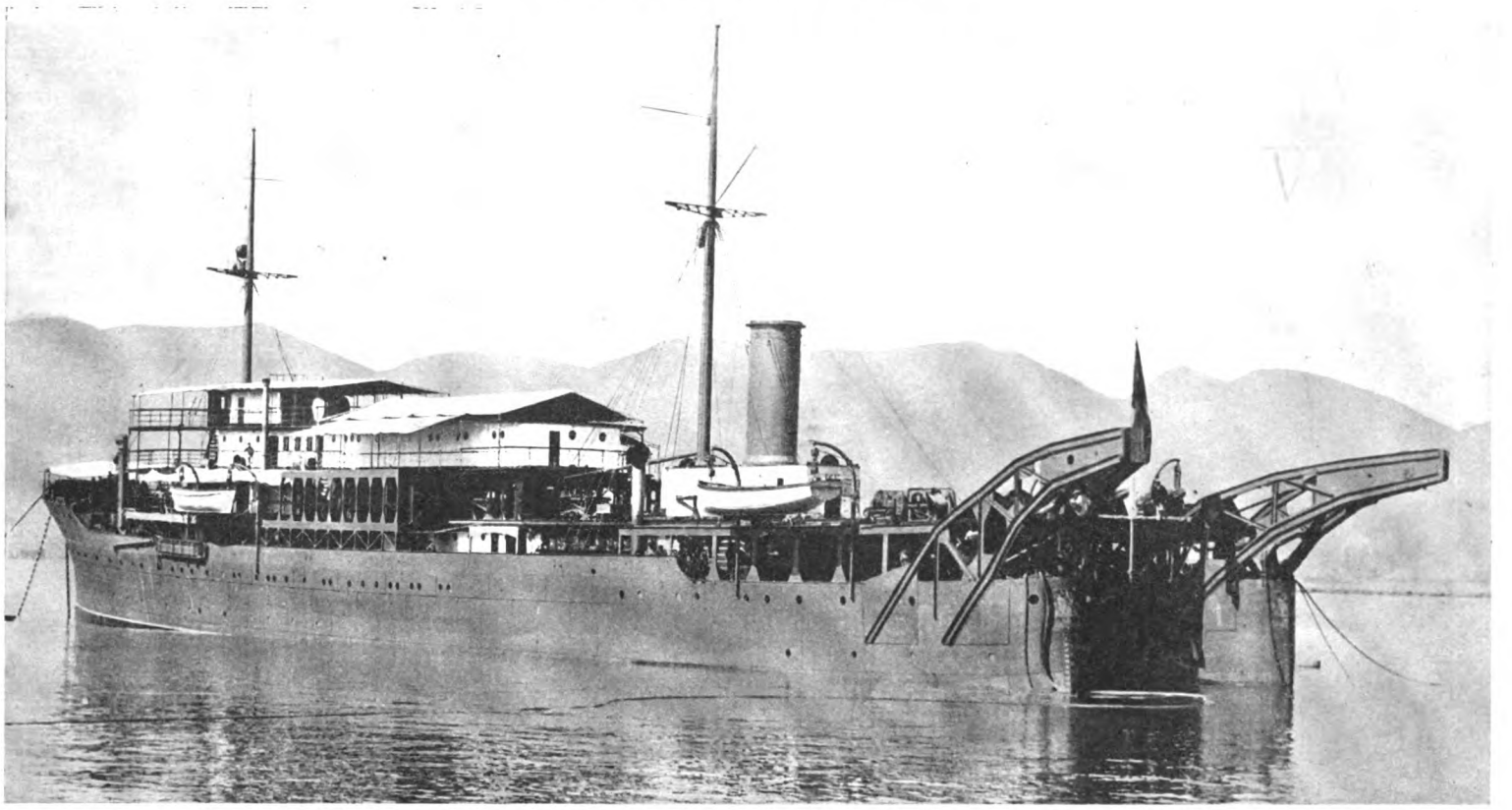
Vol. 2 SEATTLE, U. S. A., SEPTEMBER, 1917 No. 9

## The Submarine Depot Motorship "Caera"

### A Remarkable Diesel-Driven Vessel of 6,400 Horsepower

By T. ORCHARD LISLE, A. M. I. Mar. E.



SUBMARINE DEPOT MOTORSHIP "CAERA," BUILT FOR BRAZILIAN GOVERNMENT BY GIO. ANSALDO & CO., GENOA, ITALY

UNDOUBTEDLY the most remarkable Diesel-driven vessel ever built, and the largest and most complete of her type ever constructed for any navy is the "Caera," which was launched in 1915 at the yards of Gio. Ansaldo & Company, Genoa, Italy, where great strides have been made in developing the Diesel engine, particularly for submarine and tankship operation. The "Caera" certainly is a most ambitous vessel, the two main propelling Diesel engines together aggregating 6,400 i. h. p., so that she ranks next in power to the U. S. tanker "Maumee," which is the highest-powered motor vessel afloat.

But, as a ship the "Caera" is far more important and interesting than the "Maumee," whose interests rest solely with the propelling machinery, whereas the "Caera" from stem to stern is bristling in novelty and distinction. She is a submarine mother, or depot ship, and is capable of raising a sunken or damaged submarine and stowing it away in the dry dock in the interior of the hull and making all repairs at sea, and then relaunching the submarine in safety.

Originally the "Caera" was ordered by Brazil; but whether she even left Italy I will leave Germany guessing, and in this respect I will mention that Germany never obtained delivery of the 2,600-3,000 b. h. p. Diesel-driven 1,000-ton submarine which the same builders completed nearly two years ago, and which the Italian Navy took over. I am enabled to publish some excellent photographs of the "Caera," which I have just received from Italy—and these are the first to reach America. I had plans of this vessel when she first was ordered about four years ago; but unfortunately left the same in England, so am unable to reproduce them.

The "Caera" is not unlike some of the steam-driven submarine motorships built for Germany and Great Britain, but is larger and far more complete, the dock in her interior alone being 210 ft. with a useful length of 190 ft., and a diameter of 23 ft. with 25 ft. at the entrance. While she has complete accommodation for the officers and crews of six submarines, or about 130 men, in addition to her own crew, as well as sufficient spare fuel-oil for twelve large submarines. Her own cruising radius at 10 knots is 4,000 nautical miles. Her armament consists of four 4-in. guns and four 2-2-in. rapid-fire guns.

Her general dimensions are as follows:

| | |
|---|---|
| Length | 326′ 0″ |
| Beam | 51′ 0″ |
| Draught | 13′ 0″ |
| Indicated-horse-power | 6,400 h. p. |
| Brake-horse-power | 4,400 h. p. |
| D. W. Tonnage | 3,800 tons |
| Displacement | 4,200 metric tons |
| Max. speed | 14 knots |

Because she also is an instruction ship for the production of submarine engineers, her machinery follows submarine Diesel-engine design as closely as feasible. Consequently, the revolution speed is somewhat high for motors of such great power, being designed to turn at 130 r. p. m., at which speed each engine develops 3,200 indicated-horsepower, which is equivalent to 2,200 brake-horsepower, or 3,000 steam i. h. p. But a maximum power of 2,350 b. h. p. should be obtained per engine without abnormal overload, so that the possible total indicated-horsepower obtainable is not far short of seven thousand. This makes her close to the "Maumee" in power.

There are six cylinders per engine, each 24 5/10 in. bore by 35 4/10 in. stroke, so that the piston-speed is 767 ft. per minute. The two-cycle direct-reversible port-scavenging, single-acting principle has been adopted, and the scavenging-pump is formed by an enlargement of the lower piston, generally known as the stepped-piston design. As the two-cycle principle has been adopted, the economy is not so pronounced as with the four-cycle type, there being 15 to 18% difference, so the full-speed consumption is a little over 10 tons per engine per 24-hour day. This means 140 barrels per day of crude oil for the two engines, which is very low compared with a steamer of similar size, speed and power.

Generally, however, the ship cruises at 10 knots, so that the revolutions are more moderate and the fuel-consumption lower than the figures quoted. Reversing is carried out by compressed air, by means of which all the operations are effected, although hand power may be employed in case of emergency or desire. All the three valves, air-starting, fuel, and scavenge-distribution, can be set in their requisite position for astern running by turning the cams through an angle, and this is performed by means of the gear, seen in front of the camshaft and slightly below it, between the second and third cylinders. Turning a hand-wheel causes this rotation, or, more usually, the servo-motor brought into action by a small lever near the hand wheel.

There are six independent fuel-pumps for pumping the oil to the fuel-valves, to each of which there is one suction and two delivery valves. The regulation of the pumps and hence the speed of the engine is carried out through the suction-valves, which are controlled from the platform by a micrometer screw arrangement. There is an Aspinwall governor fitted, which is brought into action when the speed exceeds a certain predetermined limit, lifting the suction valves and cutting out the pumps.

No striking novelty is introduced in the design of the engine so far as the bedplate and framing are concerned, the cylinders being supported by a cast-iron framework, whilst as forced lubrication is adopted the whole is inclosed by means of

six large doors, attached by a few bolts, in each of which is a small circular inspection plate, which comes away by hand.

There are three double-acting scavenge-pumps at the back of the engine, driven by means of balance levers from the crossheads in a manner usually employed, while at the forward end are the air compressors for the injection and starting air, these being driven off the crankshaft. Situated close to these compressors are the lubricating, cooling water, bilge, and other pumps, the engine being rendered as independent as possible.

In each cylinder cover is a fuel-pulverizer (with an air-valve controlling the amount of air admitted with the oil according to the load), the starting-valve, and a safety-valve. They are all operated from the camshaft, which is in the position commonly adopted, and is driven from the crankshaft through an intermediate shaft. The arrangement of the levers, which are lifted or depressed by the cams for the actuation of the valves, is interesting, in that they are all vertical, and in the case of the starting and fuel valves are linked at the top to the horizontal main valve levels, which are pivoted on a spindle supported by short columns from the cylinder cover.

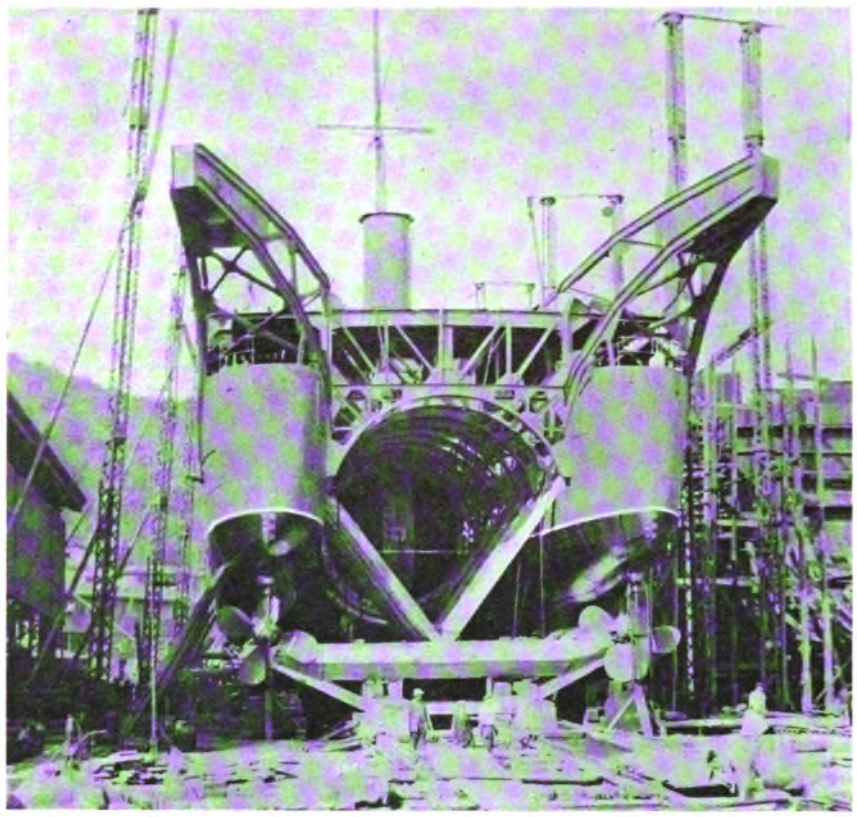
Every facility has been provided for maintaining the flotilla at sea, and the parent ship has machinery for charging the accumulators, besides which a stock of these is carried as spares, equal to half the number on the six submarines. There are two charging dynamos of 150 k. w., each coupled to four-cylinder, high-speed, two-cycle Diesel engines. This auxiliary machinery and the main motors will serve the very useful purpose of giving instruction to the men who are to run the submarines, and as this experience is otherwise difficult to obtain there is great foresight in the system.

Besides supplying the power for lighting the ship, for several auxiliary motors, and for charging the submarines' accumulators, these dynamos provide current for the operation of two electrically-driven air compressors. One of these compresses up to 75 atmospheres, a pressure suitable for starting and maneuvering the Diesel engines, while the other raises the pressure from 75 to 150 atmospheres. All the air reservoirs of three 250-ton submersibles can be charged by this in 4¼ hours, while all those of three 370-ton craft can be charged in just over six hours.

Two electrically-driven centrifugal pumps are fitted in the engine-rooms for forced lubrication, and these can pump 18 tons per hour, while there are two other pumps of 20 tons per hour capacity as auxiliaries. The only steam-driven plant on board is an air-compressor of 20 litres per minute capacity, compressing up to 150 atmospheres, in case of complete loss of air, and a plunger-type compressor capable of delivering 1,200 litres per minute at six atmospheres for testing the submersibles.

Complete stores are carried on the parent ship for all the submersibles, including the torpedoes, and there is a large workshop for carrying out repairs.

The value of such a motorship as the "Caera" clearly is demonstrated by this description alone. Yet even the lesson of the submarine "F-4" does not appear to have made the U. S. Navy Department understand that one or more similar ships would be most valuable adjuncts to the Navy. The sooner a ship like the "Caera" is built the quicker will our submarine flotilla become as efficient as those of other nations.



M. S. "CAERA," SHOWING STRIKING STERN CONSTRUCTION

### CONCRETE-BUILT MOTORSHIP.

Concrete vessels are receiving considerable attention in Great Britain, at the present time, and the construction of motor-driven concrete ships has been taken up by James Pollock Sons & Co., Ltd., of London, and the first to be laid down has a length of 92 ft. 4 ins. a breadth of 19 ft., and a depth of 10 ft., and they are also about to construct a swim-barge of 130 tons capacity.

The power of the first named vessel will consist of a Bolinders surface-ignition-type oil-engine of 120 b. h. p., and on deck there will be a motor winch, and the vessel will have the usual raised quarter-deck and forecastle, a large hold, hatchway, and the machinery will be installed aft. Because of the materials used it is expected that these reinforced concrete vessels will be perfectly tight in a few weeks after construction and that they are calculated to be slightly stronger than a steel ship six weeks after construction. The strength of the concrete then will gradually increase right up to the time the vessel is 15 years old, and it is even believed that the vessel will be of use when it is several hundred years old. Furthermore, they will be able to resist a local 20-ton blow by collision with another vessel or otherwise, at one point and the weakest at that, without damage.

### COMPULSORY TOWAGE FOR SAILING SHIPS.

Every sailing vessel which exceeds 400 tons gross or carries a cargo exceeding $20,000.00 in value, shall when entering or leaving any port in the United Kingdom, or when proceeding along the coast of the United Kingdom, be towed as directed by any naval officer. Wise shipowners will install oil engines and save towing fees.

### THE MOTORSHIP "CARL PEDER."

A small steel motorship named the "Carl Peder" was launched last June from the Vansburg shipyard at Tossi, Sweden, for the Baltic trade. She is of 750 tons gross and is driven by a 250 b. h. p. crude-oil-engine.

### GETTING READY THE MISSISSIPPI FOR COMMERCIAL MOTORBOATING.

The War Department is speeding up improvement work on the Upper Mississippi this summer as a preparedness measure. With the war promising to still further increase the problems of transportation already at the acute stage, the installation of barge lines on the Upper Mississippi to help move the great agricultural and mineral resources of the north middle states is receiving serious attention by the War Department. The opening of navigation to Minneapolis by the completion of the great dam and reservoir makes revival of freighting on the Mississippi much more practicable than it has been heretofore. The first boat to land at Minneapolis reached the city's docks July 22. It pushed a tow of 1000 plows on four barges. An officer of the War Department and traffic men for large machinery concerns made the trip to study river conditions, cost of towing, and it is expected the barges are the forerunner of many other barge shipments between Minneapolis and cities farther down river. In this revival of navigation the barge propelled by its own engines undoubtedly will supersede the old-fashioned steamboat and its clumsy slow towing methods. Several types of these new barges are being tried out on the river.

Work of contracting and deepening the channel by the construction of dams is being pushed with speed. Wherever the waters of the Upper River spread unduly these dams made of alternate layers of willows bound into mattresses and rocks are being built from shore. Their purpose is to divert the waters into one main groove which will give six to ten feet of water throughout the season of navigation. Government building barges are at work at various places between St. Louis and St. Paul this summer, officers of the Engineering Department of the U. S. Army being in charge. Beside building dams, banks are being riprapped to prevent wash and the forming of sand bars.

### NEW NORWEGIAN STEEL MOTORSHIPS.

Mr. Fred Olsen of Christiania, says Shipping Illustrated, is one of several Scandinavian shipowners to adopt a policy of building up a complete motorship fleet, others including the East Asiatic Co., the North Star Co., the United Steamship Co., and the Norwegian-Mexican Line. Mr. Fred Olsen is having built six large Diesel-driven steel motorships as the result of his experiences as owner of the motorship "Brazil," which was built for him by the Akers Mekaniste Verksted of Christiania,—the licensees of Burmeister & Wain of Copenhagen, Denmark.

Three of Mr. Olsen's new motorships are building at the Netherlands Shipbuilding Company and will be Werkspoor-Diesel-engined by the sister company, the Netherlands Engineering Works, both of Amsterdam, Holland. The other three motorships are being built by Burmeister & Wain. The latter will be of 9,500 tons d. w. c. each, and will be fitted with two 1,550 i. h. p. four-cycle-type oil motors, giving a speed of 11¼ knots. The Werkspoor-engined ships will vary slightly from this. The B. & W. ships are of a standardized type and fifteen sister motorships are under construction in the same yard. All Mr. Olsen's ships will soon be in commission.

### DR. AMUNDSEN'S EXPLORATION MOTORSHIP.

The new auxiliary motorship built for Dr. Amundsen, who discovered the South Pole, has been launched by the Chris. Jensen shipyard, Asker, Norway. This vessel is 120 ft. long by 40 ft. breadth and is fitted with a Bolinder motor. It may be remembered that Dr. Amundsen's previous ship, the "Fram," was Diesel-driven and he was able to carry six months' fuel supply.

### NEW TWIN-SCREW DIESEL MOTORSHIP.

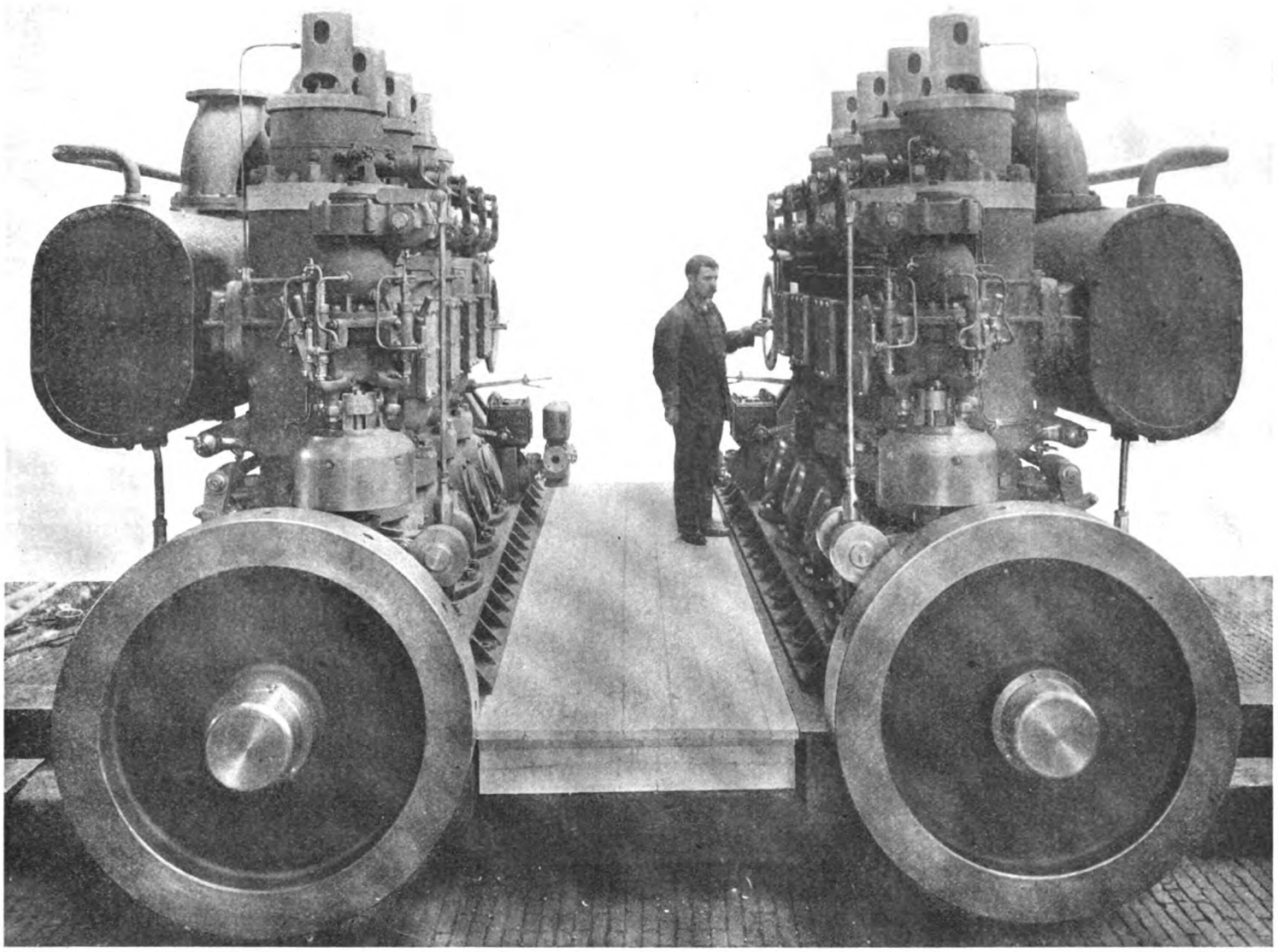
A new steel-built motorship named the "Svealand" has just been placed in service in Sweden, and her propelling plant consists of two Polar-Diesel engines of 875 b. h. p. aggregate, driving her at 10 knots. She is of 1,500 tons d. w. c. and has a length of 227 ft. with 34 ft. beam and 14½ ft. loaded draught. Four 2-ton deck winches are steam driven from an oil-fired donkey-boiler.

### IN RUSSIA.

It is very curious to see a half-page advertisement for the Krupp submarine-type Diesel oil engines in the business section of our Russian contemporary Teplocod (Motorship). Krupps ever were great people for publicity. Many other advertisements are for American marine motors, such as the Regal, the Kermath, Cragg, Scripps, Red Wing, Waterman and Caille.

# The Motor Tankship "Hera"

A Small Surface-Ignition Oil-Engined Type That Could Be Built in America in Large Standardized Numbers for Running the Submarine Blockade



THE TWO 500 B. H. P. KROMHOUT MOTORS OF THE M. S. "HERA"

THROUGHOUT the United States there are numerous engineering companies building marine crude-oil engines of the surface-ignition class; but, so far, the authorities at Washington have not seen fit to utilize them for installation in ships required to break the submarine blockade. Therefore, we herewith give illustrations and details of a small steel tankship that could rapidly be standardized and built in many of the smaller steel shipyards. Such ships could be used for carrying crude oil, or lubricating oil to the Allies; but not bulk gasoline, because of the hot-bulb, or rather the naked flame of the torch used to heat the hot-bulb, ball or plate, when starting.

An objection that has been raised against the use of large numbers of small ships to break the submarine blockade is that they will take so many captains, mates and chief-engineers. This, however, could easily be overcome by chartering our new ships for the period of the war to our Allies at a mutually reasonable rate, as domestic shipowners have been doing, or by admitting such important men to the American merchant marine during the same term.

Secondly, it should be borne in mind that every week about 20 captains, 20 first mates and 20 chief-engineers of the Allied nations, apart from neutrals, lose their berths, (some unfortunately lose their lives) owing to the steady sinking of ships by U-boats. And, as the vessels are being sunk much quicker than they are being built, it stands to reason that there must be plenty of experienced navigators and engineers open for positions particularly in Great Britain, whose merchant fleet has suffered the most, its tonnage now being 3½ millions less than it was before the war. We all are fighting shoulder-to-shoulder for a common cause, therefore there should be no objection to placing some of our new ships in charge of capable French and British officers and thus supply an important deficiency, meanwhile the ships remain part of America's new great merchant marine.

There is one outstanding argument, and that is —if European shipowners find such a vessel, as the one we are about to describe, perfectly practical and reliable, as well as economical, then the U. S. Emergency Fleet Corporation cannot dispute their usefulness, although, of course, large vessels may be more suitable because of other considerations. If necessary, some of the vessels could have a single Diesel-type engine of 500 b. h. p. at 170 r. p. m. installed. In fact, this was done with two sister ships to this vessel by the owners, namely, the "Heatia" and the "Lara."

The "Hera," as this little motor vessel is named, was built by the Dordrecht Shipbuilding Co., Dordrecht, Holland, for the Dutch Indies Tank Steamship Company (a subsidiary of the Royal Dutch Shell Co.), and is managed for her owners by the Anglo-Saxon Petroleum Company of London, England.

She is a twin-screw steel-built ship, carrying 450 tons of oil in bulk on a draught of 10 ft., and at a speed of 8 to 9 knots. Her length is 163 ft. with a moulded breadth of 28 ft. 6 ins., and a moulded depth of 12 ft. Her machinery was built by D. Goedkoop, Jr., of Amsterdam, and consists of twin four-cylinder surface-ignition type Kromhout crude-oil engines each of 275 b. h. p. at 220 revs. per minute, or equivalent in aggregate to about 650 steam indicated-horse-power, these motors driving out-turning propellers. They are of the trunk piston, two-cycle type, without water-injection, crossheads and guides. Of course, they are direct-reversble, but a wheel-controlled clutch is fitted between the thrust-block and the engine in order to facilitate the reversing by taking off the load. It is hardly necessary to add that the Kromhout engine is one of the best of its type, and the illustration will reveal good design and workmanship. Unfortunately this particular make of engine is little known to American shipowners, although it is built both in England and Holland, where large numbers are in service. These sister ships referred to have Werkspoor-Diesel engines installed.

The machinery is installed aft, as is usual with tankers, and over the engine-room are the officers' and engineers' quarters, the crew having their accommodation in the forecastle forward. Abaft of the engine-room are the fuel-bunker tanks and the stores, while in the rear of the engine-room is a donkey-boiler, oil-fired by the Meyer system. This boiler furnishes steam for the steering-gear, the cargo-pump, bunker-pump, two other pumps, the anchor, capstan, windlass, and a cargo-winch on the fore-deck. The smoke from this donkey-boiler, as well as the engine-exhaust gases are carried to a smoke-stack.

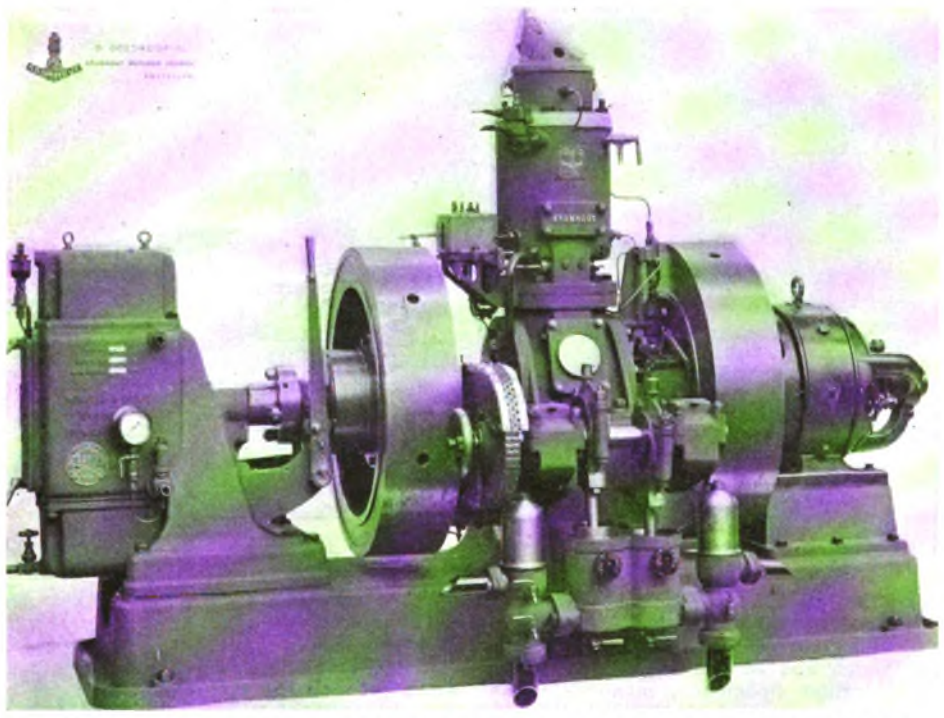
There also is a Kromhout motor-driven auxiliary set, this consisting of a single-cylinder surface-ignition oil-engine, driving a Reavell air-compressor, an electric-lighting set, a bilge-pump, and a spare cooling-pump for the main engine circulating arrangements.

The Kromhout engine differs from many sur-

MOTORSHIP "HERA," OWNED BY THE ANGLO-SAXON PETROLEUM CO., LONDON, ENGLAND

face-ignition type oil engines, inasmuch as it has a hot-plate instead of a hot-bulb, for ignition purposes. No water injection is employed but the cylinder heads are water jacketed. These heads are detachable, and are fitted with a cover at the top. During operation, no part of the engine that can be seen rises to a red-heat. A torch is used for starting; but not when running light or under load. Generally speaking the design and princip'e of the usual run of surface-ignition marine oil engines.

Injection of fuel is by cam actuated four pumps per engine, or one for every cylinder, and these are grouped together at the forward end of the engine, and are equipped with priming levers. A centrifugal governor controls the engine speed by moving the operating-cams along an inclined plane, giving a longer or shorter stroke to the fuel-pumps as the case may be, thus varying the amount of fuel injected each revolution. Both starting and reversing are carried out by compressed air, control of maneuvering being by a lever and hand wheel for the clutch. The total time from ahead to astern is about five seconds, which provides better maneuvering qualities than do most steam engines.



KROMHOUT AUXILIARY ELECTRIC LIGHTING AND AIR-COMPRESSING SET OF M. S. "HERA"

## MOTORSHIP "MISSISSIPPI" IN WAR SERVICE.

As the war progresses and peaceful merchant ships keep having difficulties in dodging the elusive U-boat, many discussions have arisen regarding the advantages of the low visibility of motorships. No more shining example exists of this than the comparative immunity from submarine attack than the motorship "Mississippi" has experienced. On one voyage across from England to America the "Mississippi" was twice attacked by submarines, but owing to the reserve power of her Diesel engines, which were driven at the maximum speed long enough to outdistance the submarine, she was enabled to escape. The vessel, which was placed in operation in January, 1914, by the Atlantic Transport Line, was built by Harland and Wolfe of Glasgow and engined by the Burmeister and Wain Oil Engine Co. of Glasgow. She is a steel vessel 305 feet long, 7,000 tons d. w. c. and powered with two 1,300 h. p. Burmeister and Wain 4-cycle Diesel engines which can be forced to develop a total of 3,000 h. p. for short periods when the safety of the ship depends upon them. The chief engineer, a former steam engineer, is now enthusiastic on Diesel engines.

## MOTORSHIP "CARMELA."

Among the large sailing vessels in the American merchant marine to have motors installed in the past few years one of the most noteworthy is the bark "Carmela," owned by Capt. Pierce of Mobile, Alabama. The "Carmela" is a steel vessel of 2,200 tons d. w. c., 262 feet long, 37 feet 6 inches beam, and 22 feet depth. Two M 1-160 h. p. Bolinder surface-ignition engines are installed which drive the vessel at a speed of 7 knots. Two engineers and an oiler constitute the engine room force and so successful has this installation been that Capt. Pierce is having a bark built in which he is having oil engnes installed, as he is satisfied that auxiliary motors are necessary in a sailing vessel.

## USEFUL MOTORS.

Burmeister & Wain, the great Danish motorship builders, use three large passenger motor launches for carrying men to and from the island of Revshale, where their shipyard is situated. These boats carry 150 men, and one is equipped with two American-built Regal gasoline motors. Thus the United States unconsciously assists in the construction of motorships abroad.

## SOME TROUBLES WITH SURFACE-IGNITION ENGINES.

By GEORGE NICHOLSON.

IN spite of the fact that surface ignition engines have given splendid service and have been in a great number of instances very satisfactory, there have been cases where some installations made by manufacturers of limited experience in this line have not been so, and it has been my experience to operate an installation of this kind. The engines, which were twin seventy-fives, installed in a boat for use in a Latin-American country, continually caused trouble. The water injection sight feed drips were continually clogging up and had to be watched closely, besides consuming a tremendous amount of fresh water, about ten gallons per hour, indeed on the trip south we carried as much fresh water as fuel. The fuel injection nozzles, which were water-jacketed, had a pleasant habit of clogging up at the tip, at the most inopportune time, in one instance resulting in destroying the main cam and roller of the starboard engine, temporarily disabling that machine, and new ones had to be put in. The force feed oilers were continually going out of gear and as a result we had two burned out bearings which had to be replaced at sea, quite a pleasant experience I assure you, with a heavy sea running on the old Atlantic, although I am of the firm belief that the main bearings on this particular set of engines were altogether too small in surface area and therefore high bearing pressures set up which the babbitted bearings could not stand; indeed I wondered on one forty-eight-hour run that all of them did not go—all were hot in spite of the fact that we were feeding the machines nearly one gallon and a half of the best lubricating oil per hour, it could not be safely cut down or there would have been serious trouble.

Carbon was also another source of trouble, due, I believe, to the exhaust ports being of too small area and poorly located; the cylinder heads had to be taken off many times, the exhaust ports clogged up, the cylinder heads were full of carbon, and once the whole exhaust piping had to be removed, being choked full of soot the engines could not go at all until it was removed. The crankshaft of one of the engines broke and many days of waiting elapsed before a new one could be sent from the factory. I believe the crankshaft broke through preignition, one of the heads getting too hot, on account of the sight feed clogging up and cutting off the injection water. Another difficulty with these particular engines was that they could not be run idle for over ten minutes without lighting the torches, and when those eight torches were lit in a hot climate, h— had nothing on the engine room of that boat; the reverse gears were a type running only two-thirds of the speed ahead when they were reversing and the boat could not stop her headway quick enough, nearly causing a collision more than once. Well it can be seen that shipowners should be wary in selecting their machines, as Motorship has already stated; in fact the writer could po'nt out certain of the surface ignition engines bui't in this country that are not what their manufacturers claim them to be. However, there are good surface-ignition engines and the foregoing must not be construed as condemning this form of power, only in regards to this particular set of machines.

## MOTORSHIP "ALEMBEC."

Among the many installations of motors in existing sailing vessels in this country quite a few have been converted into motor vessels. The "Alembec," a barkentine of some 350 tons capacity, 105 feet over all, owned by W. S. Job & Co. of New York, but sailing under the British flag and trading between New York and Nova Scotia, had two 50 h. p. Bolinder oil engines put into her a little over a year ago and has been in continuous service since, giving good satisfaction. Her captain says the auxiliary is a sure winner.

## PROFITS FROM MOTORSHIP OPERATION.

One of the subsidiaries of the Royal Dutch Shell, namely the Shell Transport & Trading Company, owners of a large fleet of Diesel and surface-ignition types of motorships, has made a profit for 1916 of $10,311,817.00. After payment of dividends distributed there remained a balance of $7,144,883.00, from which a final dividend of 35 per cent was declared, leaving $2,182,367.00 to be carried forward. Furthermore, the stockholders have been offered one million new shares at par in the proportion of one new share to each four shares held, making a handsome bonus. Last year the dividend also was 35 per cent.

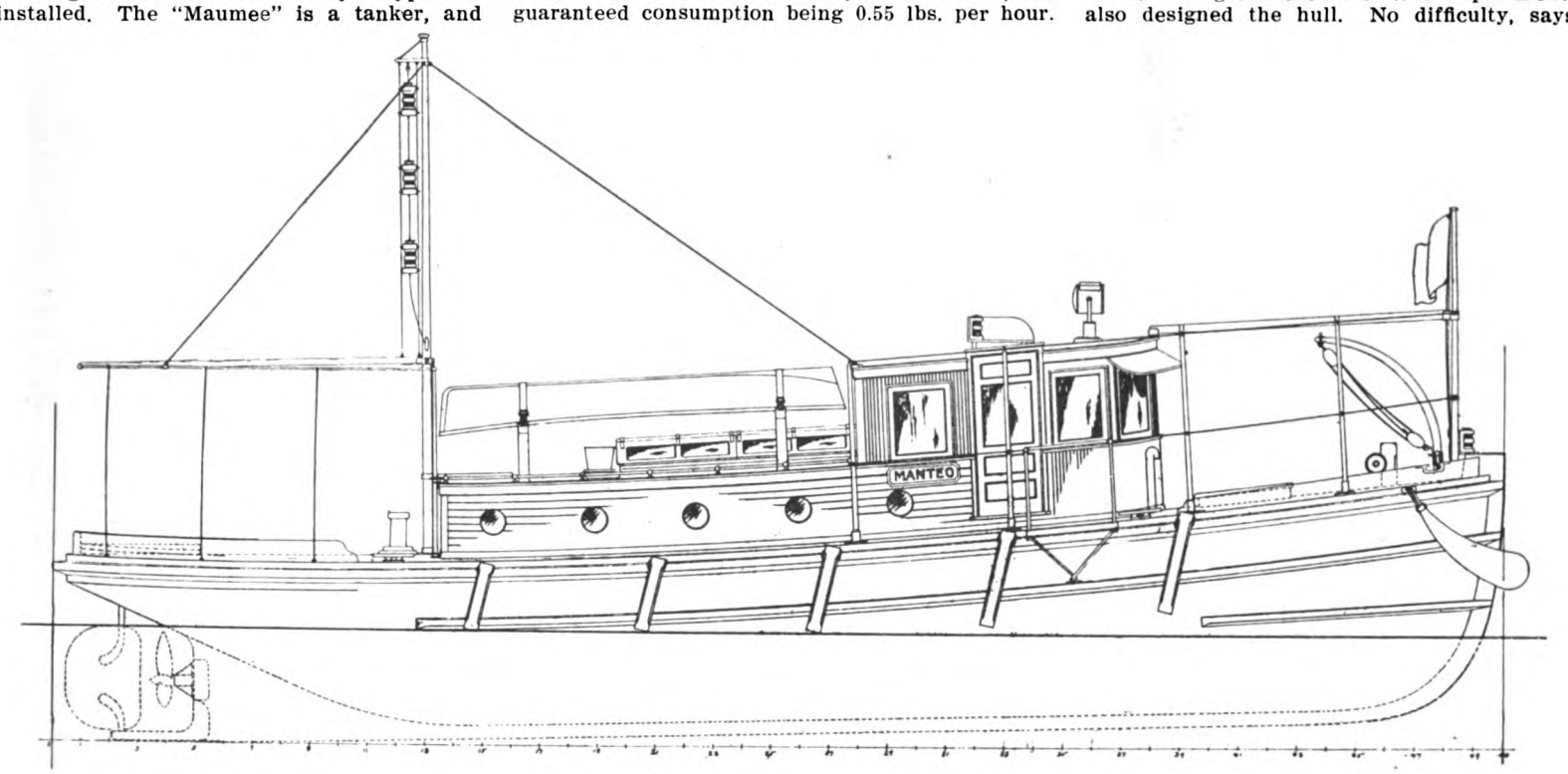
# Diesel-Driven Survey Vessel for U. S. War Department

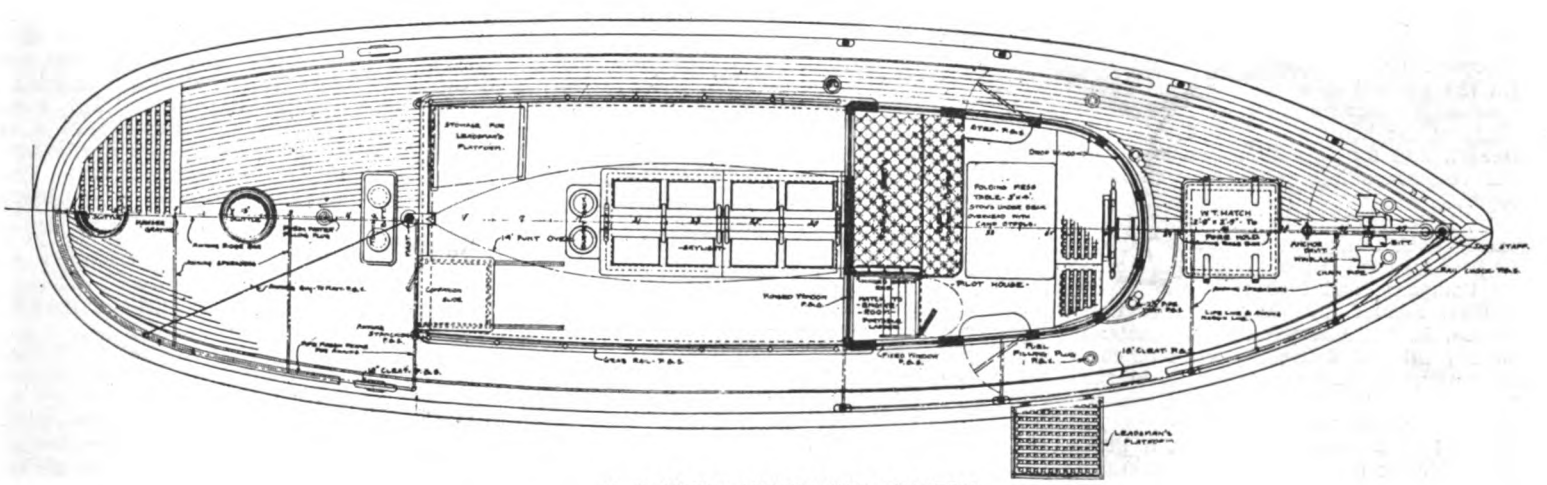
APART from submarines, the United States Government now owns three Diesel-driven vessels, namely, the 5,000 h. p. "Maumee," the 1,000 h. p. "Fulton" and the new survey-boat, or dredge-tender "Manteo"; but the latter is the first craft owned by the Government to have four-cycle-type Diesel engines installed, both the other two ships having M. A. N.-Nlseco two-cycle-type motors installed. The "Maumee" is a tanker, and the "Fulton" is a submarine tender, or mother ship, while the "Manteo" was built for the War Department.

The "Manteo" is the smallest Diesel-driven boat yet built for our government, and is a midget compared with the 15,000-ton "Maumee," being but 52 ft. long o. a. by 46½ ft. long w. l., with 13 ft. 1¼ in. breadth under guards, and 6 ft. 5½ in. moulded depth. Her propelling plant consists of a four-cylinder, four-cycle, single-acting Diesel engine of the non-reversible class, built by the Fulton Manufacturing Co. of Erie, Pa. The drive is through a mechanical reversing-gear and clutch, and the speed of the boat is estimated at 10 miles per hour. The engine was guaranteed to develop 90 b. h. p., but on the shop trials 100 b. h. p. was developed at 400 r. p. m. on a consumption of 0.53 lbs. of Pennsylvania fuel-oil, the guaranteed consumption being 0.55 lbs. per hour. For a four-cycle Diesel-type engine this is rather a high consumption, and we think could be considerably lowered by making a few minor changes to the fuel-injection system. But it must be borne in mind that the makers have not yet built very many of these motors, and doubtless they feel very satisfied that the trials were attended with success and that the consumption of fuel came within the guarantees. The air-injection pressure used was rather high, being 1,125 lbs. per sq. inch at maximum power to 750 lbs. at low speed, as the present tendency of Diesel engineers is to reduce the injecton-air pressure down to 900 lbs. or under, and the cylinder compression to below 450 lbs. This, of course, also affords economy of starting-air and even lubricating oil.

The tests of the engine were supervised by Mr. Theo. R. Vogel of the U. S. War Department, who also designed the hull. No difficulty, says Mr. Vogel, was encountered in readily starting the engine, which ran smoothly throughout the tests, which lasted four hours,—one hour at 322 r. p. m., the second at 273 r. p. m. and the third at 400 r. p. m. Readings were taken every five minutes.

In addition to the main engine there is a 1-k. w. generating-set for electric lighting. This is driven by a single-cylinder two-cycle gasoline motor turning at 700 r. p. m.



U. S. MOTOR SURVEY SHIP "MANTEO"

### RELIABILITY!

Recently the marine-superintendent of a well-known lumber company, who owns three motorships, and a number of steamers, remarked to a member of Motorship's editorial staff—"If all the machinery troubles met with during the course of ordinary steamship operation were talked about in the same manner as motorship troubles have been then the marine steam-engine today would be a failure."

### OBITUARY.

We regret to announce the death of Washington Irving Babcock, Naval Architect and Engineer, at New York on August 7th, at the age of 59. The affairs of the business so ably carried on by him will in the future be handled by the firm of Babcock and Penton at 120 Broadway, New York, and in the Penton Building, Cleveland.

### THE EXPLOSION IN THE "A-5."

The gasoline explosion on July 24th aboard the 15-year-old U. S. submarine "A-5" is a reminder of the disgraceful fact that gasoline engines are still used aboard our older craft. The Navy Department should be severely censured for allowing these antique submersibles to remain in commission without converting them to Diesel-engine power. In this particular instance the deaths of five men and injury of three others lie at the door of the Navy Department. There is no excuse for not having scrapped the entire class or else installing Diesel-type crude-oil engines, as did Russia with the gasoline-engined submarines built in the United States and shipped over. True it is the Navy Department intends converting the C and D class boats, and these should be temporarily withdrawn from commission while the change is being made. Submarine navigation at its best is a dangerous profession, but there is no reason why the lives of the crews should further be imperiled by obsolete machinery. The "A-5" was built in 1902 and has a displacement of 120 tons.

### BIG GASOLINE EXPLOSION—PLOT FEARED.

Within three hours of the completion of the article in this issue dealing with the sinking of tankships by Germany, came the announcement of the explosion and fire at the Atlantic Refining Company's plant near Philadelphia, resulting in the loss of a million gallons of gasoline, due, it is believed, to a German plot. If such proves to be the case it will endorse in a singular way the opinions expressed in the said article. Two tankships have recently been destroyed by fire in an unaccountable manner, and now the refinery! Next please!

# A Triple Screw Motorship

## Conversion of a Three-Masted Schooner to Oil-Engined Power

"SCANDINAVIA" BEFORE CONVERSION TO MOTOR POWER

"SCANDINAVIA" AFTER CONVERSION TO MOTOR POWER

TRIPLE-SCREW coastwise motorships are more rare than common; but present times in the shipping world being so abnormal that all sorts of installations are being carried out, some very practical, some distinctly the reverse. However, it is somewhat surprising that more triple screw vessels have not been built, because, three low-powered motors can be obtained much quicker than one engine of the combined power. But, where such installations are carried out we suggest that the central engine be of at least 25% higher power than the two wing engines, otherwise the extra gain by the third motor will hardly be noticed under most conditions of operation.

The illustrations, which we give are of the schooner "Skandinavia," which has been converted into a full-powered motorship of 500 tons d. w. c. by the installation of three 90 b. h. p. Kromhout marine oil-engines of the surface-ignition type. They show her both before and after conversion to motor-power.

### AMERICAN SEA POWER.

(A Review)

ONE of the most remarkable series of articles that it has been our lot to read has just been re-published in the form of a book entitled "American Sea Power," or "Oil, Ships, and a Merchant Marine for America." The first part of the book consists of a series of short articles dealing with the general questions of the formation of an American merchant marine; but it is the latter half of the book which is of such absorbing interest, and for this alone we have no hesitation in recommending every shipowner to obtain a copy.

This section is by Richard Spillane, and deals very intimately with the great fight now raging between the Standard Oil Company and the Royal Dutch Shell Company, and how that new great oil combination, headed by that extraordinary business genius, H. W. A. Deterding, is, instead of the Standard Oil Co., doing the work of controlling the production and supply of oil in the world. Not only is the information given in these articles of great value; but the entire series is handled in a masterly manner, a little jerky in style perhaps; but profoundly interesting.

Mr. Spillane in warning this country to awake to the realization of what is slowly but surely coming, tells how such strong financial interests as the Samuels, the de Rothschilds, M de la Meurthe, H. W. A. Deterding, and the Deutsche Bank, are behind the Royal Dutch Shell, which is Holland in name, but European in financial character, and that no matter the outcome of the war, how their interests will be protected.

In order that the growth of this great oil company may be appreciated, Mr. Spillane gives the capitals of the main and subsidiary companies, and their production powers. For simplicity sake we will add together the various classes of shares and convert their nominal value to United States coinage.

**Foundation Companies.**

| | U. S. Dollars. |
|---|---|
| Royal Dutch Petroleum Co. | 46,023,020.00 |
| Shell Transport & Trading Co. | 49,904,000.00 |
| Bataafsche Petroleum Co. | 56,000,000.00 |
| Anglo-Saxon Petroleum Co. | 40,000,000.00 |

**Subsidiary Companies.**

| | |
|---|---|
| Sumatra Palembang Co. | 2,800,000.00 |
| Moeara Enim Co. | 3,000,000.00 |
| Ceram Petroleum Mpig. | 806,000.00 |
| Dordtsche Petroleum Industrie Maatschappij | 7,200,000.00 |
| Dordtsche Petroleum Co. | 6,184,392.00 |
| Consolidated Dutch Petroleum Co. | 5,275,600.00 |
| Astra Romana Co. | 12,000,000.00 |
| Benito Company | 5,000,000.00 |
| Nouvelle Societe Standard Russe | 6,000,000.00 |
| Grozny-Sundja Oil Fields, Ltd. | 1,500,000.00 |
| New Schibaieff Petroleum Co., Ltd. | 5,800,000.00 |
| Ural Caspian Oil Corpn., Ltd. | 4,003,000.00 |
| North Caucasian Oil Fields, Ltd. | 3,113,000.00 |
| Anglo-Egyptian Oil Fields | 5,750,000.00 |
| United British W. I. Petroleum Synd. | 500,000.00 |
| United British Oil Fields of Trinidad | 3,250,000.00 |
| United British Refineries | 500,000.00 |
| Brunei Petroleum Co. | 4,250,000.00 |
| British Imperial Oil Co., Ltd. | 1,000,000.00 |
| British Imperial Oil Co. of South Africa | 50,000.00 |
| British Imperial Oil Co. of New Zealand | 50,000.00 |
| Kotoku Oil Fields Syndicate | 500,000.00 |
| Sarawak Concessions | ..... |
| La Corona Petroleum Co. | 25,000,000.00 |
| The Hague Association | 5,000,000.00 |
| The American Roxana Petroleum Co. | 60,000,000.00 |
| Shell Co. of California | 35,000,000.00 |
| California Oil Fields, Ltd. | 500,000.00 |
| Turner Oil Co. | 500,000.00 |
| W. K. Oil Co. | 500,000.00 |
| Valley Pipe Line Co. | 10,000,000.00 |
| Simplex Refining Co. | 2,000,000.00 |
| Venezuela Co. (controlling largest storage and oil refinery in world) | Not stated |
| Panama Canal Storage Co. | Not stated |

**Sales and Transport Companies.**

| | |
|---|---|
| Asiatic Petroleum Co. | 7,500,000.00 |
| Vereinigte Benzinwerke, of Hamburg | Not stated |
| European Petroleum Union | 11,100,000.00 |
| British Petroleum Co. | ..... |
| Homelight Oil Co. | ..... |
| Soc. Italiana Importazione Olii | 180,000.00 |
| Norsk Engelska Mineraloljeakiebolaget | 163,000.00 |
| Svensk Engelska Mineraloljeakiebolaget | 450,000.00 |
| Shell Marketing Co. | 7,500,000.00 |
| British Tanker Co. | 500,000.00 |
| Nederlandsche Indische Tankstrookboat Co. | Not stated |
| Nobel Bros. | 15,000,000.00 |
| Deutsche Petroleum Co. | 6,000,000.00 |
| Steaua Romana Co. | 18,750,000.00 |
| Paris-Rothschild Group | Holding stock |
| Burmah Oil Co. | 14,525,000.00 |
| Turkish Petroleum Co. | 400,000.00 |

The story of how H. W. A. Deterding rose from a bank clerk in Java and wrested the title of Oil King from John D. Rockefeller is told in detail. The attitude of the Royal Dutch Shell towards motorships also is told. This book has been published by "The Evening Mail" of New York City. Price, 50 cents.

### OIL-FIRED STEAMERS TO BE CONVERTED TO COAL.

According to Shipping Illustrated several ocean steamers now on the way from the Pacific Coast to Atlantic ports will on arrival be converted into coal burners, the owners claiming that the oil companies have raised prices too high to make that fuel profitable, it having gone from 57c to $1.50 a barrel. Here is a splendid reason for the installation of Diesel oil-engines, as, on many services coal would have to drop to $1.00 a ton, and oil at the same time increase to about $10.00 a barrel before the all-round economy of Diesel-driven ships could be upset or seriously challenged.

### PANAMA CANAL SUPPLY MOTOR VESSELS.

Two interesting little Diesel-driven vessels have recently been placed in service at the terminals of the Panama Canal, which were expected to make about seven knots speed; but which actually attained almost nine knots. Although having a displacement of only 120 tons, the economy of the Diesel engine gives them a radius of 2,000 nautical miles, the fuel tank being 6 tons (42 barrels) capacity in the fore-peak.

The length of these vessels is 85 ft. over all, 75 ft. on water line, 20 ft. moulded depth, and 5½ ft. loaded draught. The power consists of a four-cylinder Nlseco Diesel engine of the four-cycle type developing 120 b. h. p. and driving a propeller of 4 ft. 4 in. diameter and 2 ft. 6 in. pitch. The auxiliary machinery consists of a 24 h. p Palmer four-cycle type gasoline engine, driving a KW generator, an air-compressor, a centrifugal-pump, and a bilge-pump. The cargo-capacity consists of 50 tons of fresh water, and 20 tons of dry cargo. There also is room for 20 tons of provisions.

### THE NEW ATLAS-DIESELS MOTORER A. B.

**Fully Paid Capital of Six and Three-Quarter Million Dollars.**

Some little time ago we referred to the consolidation of the A. B. Diesels Motorer of Stockholm with the Atlas Diesel Works of the same city. Complete details of this huge new business now are to hand direct from the company, who will build Diesel engines on a huge scale.

The new combination has acquired the properties of the Nya Aktiebolaget Atlas, Stockholm; Aktiebolaget Norrby Gjuteri, Stockholm; Kontor Atlas-Diesel, Moscow; A. B. Diesels Motorer, Stockholm; and has a capital of twenty million kroners ($6,666,660.00) all of which has been fully paid up.

The board of directors consists of Mare Wallenberg (chairman), O. Lamm, E. Kinander, G. Jacobson (managing-director), A. Spangberg (managing-director).

We understand that this company owns the controlling interest of the McIntosh & Seymour Corporation, of Auburn, N. Y., who are U. S. A. builders of the Polar-Diesel marine and stationary four-cycle type engine.

### SKANDIA SALES.

Two ships built by the Washington Shipping Corporation, the Barleux and Hull No. 6, which have been sold to the French Government, are to be equipped with twin 240 H. P. Skandias. The Barleux was launched Aug. 11, and is 250x43x21. Hull No. 6 is of the same size.

The Magrudada, built by the McEachern Shipyards at Portland, and the H. C. Hansen, built by the Seaborn Shipyards Company, Tacoma, are two five-masted schooners, powered with two 240 H. P. Skandias, which will be given their trial trips shortly.

# Small U-Boat Chasers Not Effective

## But How Will Fuel Be Supplied to Destroyers if Large Numbers Are Used?

By T. ORCHARD LISLE, A. M. I., Mar. E.

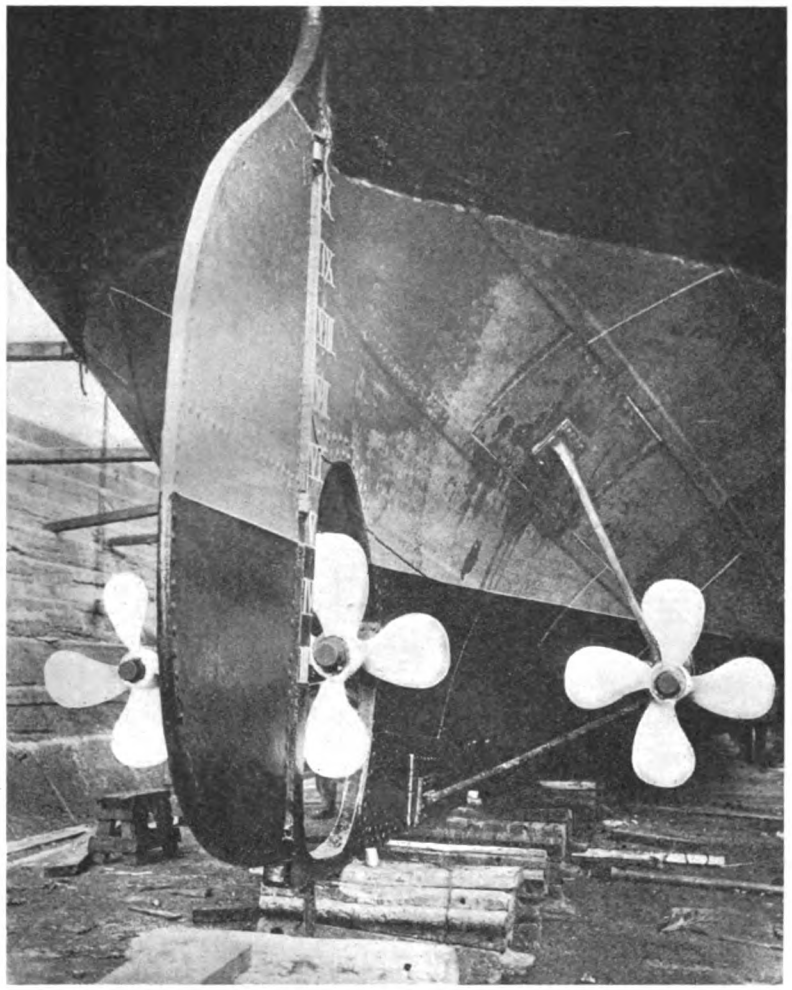
ACCORDING to reports from Washington confirmed by Secretary of the Navy, Josephus Daniels, no more gasoline-engined chasers of the size now under construction will be laid down after the present orders are completed, the U. S. naval experts having decided that it is far better to concentrate on T. B. destroyers, on the basis that one destroyer is equivalent to fifty chasers. It will be remembered that last February I pointed out in Motorship the fallacy of attempting to construct craft that are likely to be too small, and evidently my words have proved only too true, although I presume that the U. S. Navy are basing their opinion on the operations of the British 80-footers, rather than on the 110-footers now building, the first of which only recently have been completed.

In the February issue I made the following remarks as their republication is very apt at this juncture:

"It is time that the Navy Department awoke to the fact that such manoeuvres are but child's play compared with the grim task of searching for enemy submarines under actual war conditions, day after day, month after month, with but few intervals for rest.

"To successfully cope with the submarine menace America must have vessels that can do this work under these conditions, and we would do well to profit by the lesson taught by the expensive experiences of the British naval authorities. T. B. Destroyers are too expensive to construct in sufficient numbers to properly undertake the duty, (also they are required for other purposes) and gasoline boats are too small. Hence a new class of vessel must be evolved.

"The writer strongly advises Diesel crude-oil engined vessels steel-built along the lines of torpedo-boats, but smaller, not quite so fine lines and a little stronger in proportion to their size. Several sizes between 120 feet and 160 feet could be tried, but about 135 feet would seem to be the most practical."



PROPELLER ARRANGEMENT OF "SCANDINAVIA"

In the June issue I dealt very fully with a proposed Diesel-driven 135-footer, which I claimed would be ten times as effective as the 110-footers now building. The length of 135 ft. was merely selected because the hull and engines of such size could be built so much quicker than larger craft. But, by all means make them 150, 160 or 200 ft. long, as doing this will make them even more effective.

I repeat with emphasis and conviction that "the most logical solution of ending the Diesel-driven submarine menace is to utilize the Diesel engine for propelling vessels out for their capture."

Germany's newest submarines are as large as 1,000 tons surface-displacement and their surface-speed 19 to 20 knots. All are Diesel-driven and apparently very reliable—certainly effective.

Therefore, it is practical and feasible for America to build steel surface vessels of 500 to 800 tons displacement and with a speed of 20-25 knots and using submarine-type Diesel engines for propulsion purposes.

If the Diesel engine is reliable enough to propel the German U-boats, it is reliable enough to propel big submarine destroyers.

America with her vast engineering resources should be able to build such craft far more quickly than Germany can build submarines. Furthermore, we ought to be able to build six in the time it takes to build one ordinary turbine-driven torpedo-boat destroyer.

I always have agreed that our torpedo-boat-destroyers are the most effective of all weapons against the U-boat; but, if we build a hundred additional destroyers—less will be insufficient—how on earth are we going to send over sufficient fuel for them?

Every one, if of usual speed and power, will need eight to ten tons of oil-fuel an hour. That is to say, 576,000 to 720,000 tons per 30 day month for 100 destroyers. Where are the tankers (fuel-supply ships) to come from?

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### THE DIESEL MOTORSHIP "SECUNDUS."

IN one way Germany is fortunate, as only one of her big Diesel motorships is in the hands of her enemies, and this is the Sulzer (Swiss) Diesel engined ship "Monte Penedo," which recently was taken over by Brazil. One ship that we Allies would like to have had and that is the masterpiece of the great Blohm & Voss shipyard, the motorship "Secundus," owned by the Hamburg-American Line. The "Monte Penedo" was owned by the Hamburg-South American Line.

It may be remembered that it took two sets of Diesel engines to be made (the first having been scrapped after shop trials) before Blohm & Voss engined the "Secundus," and that these builders believed that they had made great strides in the development of the marine Diesel engine.

Some statements have been secured, signed by the Hamburg-American Co., regarding the maiden voyage of the "Secundus," made before the war. The only excuses that we have in giving these now, are, that they are of considerable interest, and that they never have been published before.

The voyages were from Hamburg to New York and New Orleans to Hamburg, just prior to the outbreak of war.

| | Outward. | Homeward. |
|---|---|---|
| Period | 19th April to 4th May | 2d June to 23d June |
| Distance covered | 3,592 sea-miles | 5,042 sea-miles |
| Best day's run | 271.4 miles | 314 miles |
| Average speed | 10.46 knots | 10.42 knots |
| Propeller slip | 19.6% | 11.0% |
| Average engine speed | 114.7 r. p. m. | 107 r. p. m. |
| I. H. P. (average) | 3,389 h. p. | 2,566 h. p. |
| Fuel-consumption per day | 12.53 tons | 10.28 tons |
| Lubricating-oil consumption per day | 476 Kg. | 430 Kg. |

The Hamburg-American Co. remark that the lubricating oil consumption is high; but this was the first voyage, and that the engine was not inclosed, which they intended having done, so that the consumption would be considerably reduced.

The "Secundus," it may be remembered, is 398 ft. 4 ins. long, 52 ft. 6 ins. in breadth, 35 ft. moulded depth, and carries 7,750 tons on a draught of 23 ft. The motors are of the two-cycle class, and each developed on test 1,350 shaft-horse-power, or 1,800 i. h. p. at 120 r. p. m. from four-single-acting cylinders 23⅝" by 36 3/16". The mechanical efficiency is 75%, the fuel consumption being 0.32 lbs. per i. h. p. hour, or 0.425 lbs. per b. h. p. hour, which is very excellent for a two-cycle type Diesel engine.

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### WANTS PERFECT U. S. MOTORSHIP.

James Kennedy, head of the marine department of the Gulf Refining company, is a believer in the future of the Diesel engine, and thinks that engine builders in this country should lose no time in bending their efforts toward bringing the marine motor to that point of perfection where it can claim recognition as a tried and dependable means of propulsion for ocean-going ships.

Were there such an engine being turned out here, I am sure it would receive the support of American shipping men. The Gulf Refining company has hesitated to enter the motorship field because it doesn't feel that a reliable motor has been built in this country thus far.

"I don't think it would be wise to install a foreign-built motor in American vessels, because of the difficulty in obtaining duplicate parts when repairs are necessary.

**Progress Too Slow.**

"So far as the development of the Diesel in this country is concerned, I don't think our builders have made the progress they could have made. I believe they should get busy and do all that the abnormal conditions under which we live will permit.

"The war, while it has, of course, retarded to a great extent the development of the motorship has also been responsible for a certain amount of the progress that has been made both here and abroad in the last three years.

"It has been difficult for the last two years, on account of the war, to obtain marine steam engines and boilers. This has had a tendency to make people think about other methods of propulsion, of which the Diesel is one.

"I don't believe there is much doubt in anybody's mind as to the excellent qualities of the Diesel engine—when it works. It is economical, clean, adds greatly to a vessel's capacity for cargo and has many other advantages not found in a steamer.

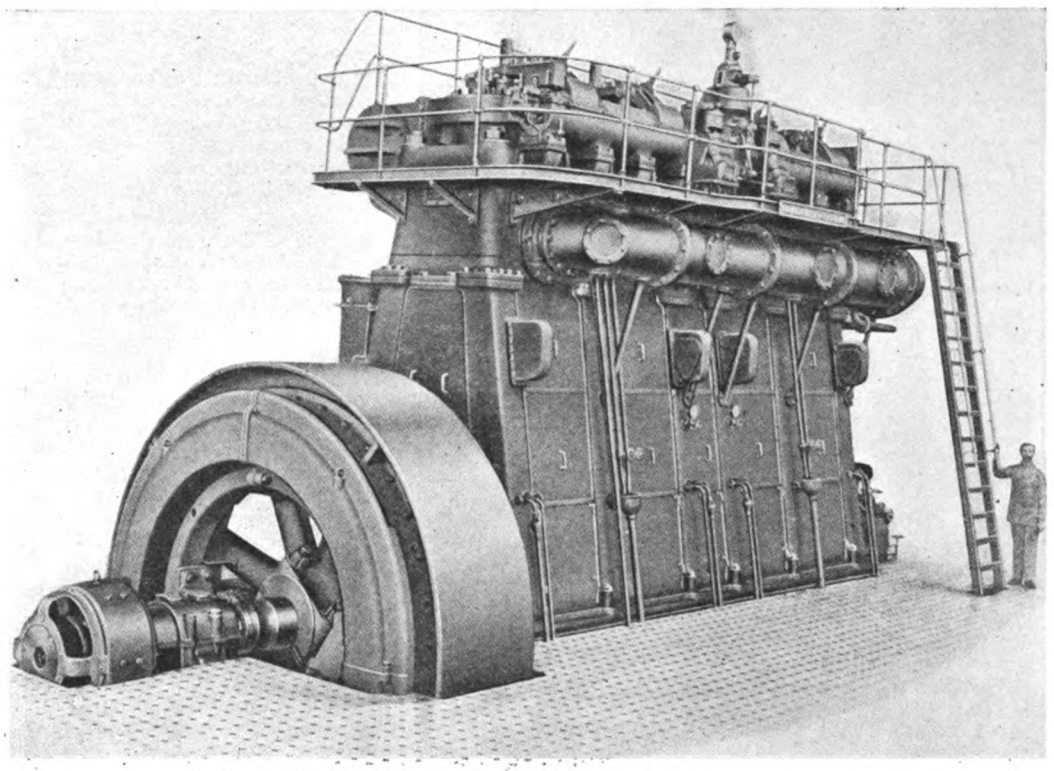
"I imagine that the trouble encountered by many motorships could be traced to incapacity on the part of those in charge of the engines. A Diesel engine requires trained mechanics. Engineers of the rough and ready type, who are all right on the steam engines, know only enough to get themselves and the motor in trouble when confronted with the Diesel.

"The difficulty in obtaining efficient hands has been one of the reasons for the Gulf Refining company's hesitancy in building motorships. This company did, however, intend to have a motorship built by Werkspoor, but the outbreak of the war interfered, and now there is small chance of obtaining foreign built motors until peace has been declared."—The Evening Mail.

# Oil Engines for Dry Docks

## World's Largest Diesel Engine Supplies Power at Harland & Wolff's

ONE important use of the Diesel engine which domestic shipbuilders apparently have totally ignored in America is that of supplying power for dry docks, although Great Britain, Italy and Germany have found this class of power far superior for the purpose than are steam engines. Both of the naval dry-docks at Taranto and Venice, Italy, have very elaborate Diesel outfits, the machinery for which was built by Franco Tosi of Italy to the order of the Director-General of Construction of the Royal Italian Navy. Also the Harland & Wolff shipyard at Belfast has a Diesel plant of 4,000 b. h. p. and the new Liverpool Docks are Diesel equipped.



ONE OF THE 900-1000 H. P. TOSI DIESEL ENGINES INSTALLED IN THE ROYAL ITALIAN DOCKYARDS

The plant at Taranto consists of three Tosi Diesel engines of 900-1000 b. h. p. each, while the plant at Venice has two of the same power, so that the total power is 4,500 b. h. p., meaning an order of considerable value to the builders. But, this only represents a small portion of the number of Diesel engines built by Franco Tosi, as up to Dec. 1st last, their orders actually completed total 382 engines, aggregating 83,087 b. h. p. At today's prices this would represent a value in excess of eight million dollars, indicating the business available in oil engines.

The 900-1000 b. h. p. Tosi-Diesel engines at Venice and Taranto are of identical design. Each is of the two-cycle type, with four-cylinders 520 mm. (20 4/10") bore by 900 mm. (35 4/10") stroke and developing 900 b. h. p. at 140 r. p. m. The piston speed is 3.9 metres per second. These engines are capable of developing 1,000 b. h. p. either at 140 or 150 r. p. m. by increasing the fuel-injection air from 64 to 70 atmospheres per sq. inch, or by increasing the speed. The cylinder compression is 34 atmospheres per sq. inch, rising to 36 atmospheres during combustion.

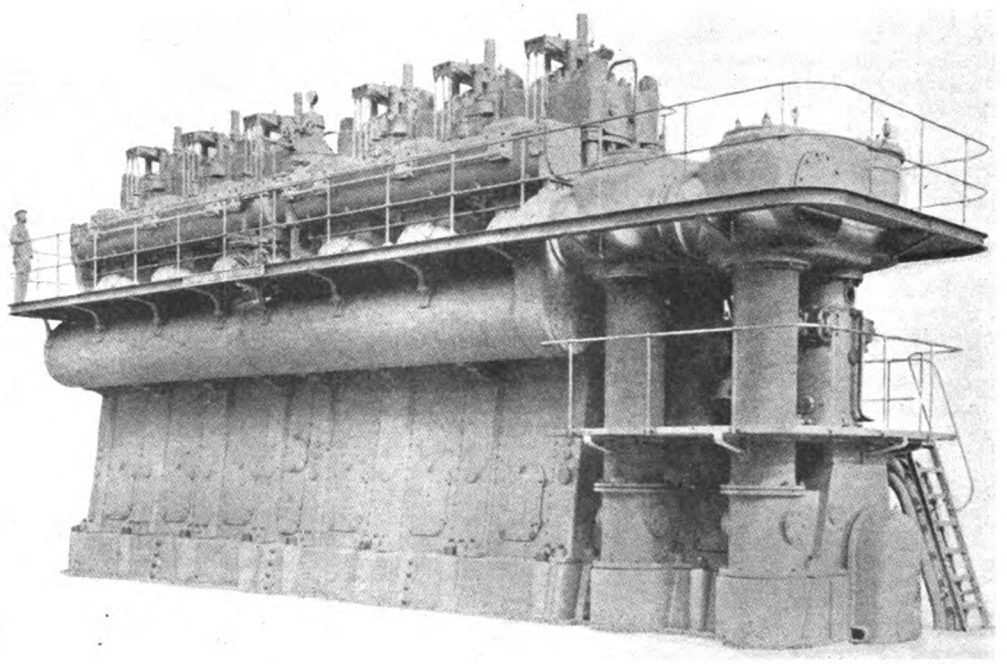
Each engine drives an alternating generator of 66 kw. which furnishes the power for centrifugal pumps. These pumps are arranged horizontally and are driven by a vertical shaft. When the pumps are not required the entire Diesel-electric plant can be used as a power and lighting station.

The Diesel engines are of the valve-scavenging class and in each cylinder head are four scavenging valves through which the air enters and ejects the final exhaust gases out at ports opened by the piston at the end of the stroke. This air pressure is 0.35 atmospheres per sq. inch, and is furnished by two beam-lever-driven air pumps at the back of the engine. At one end of the engine is a four-stage Reavell air-compressor for supplying high-pressure air for starting and fuel-injection.

The pistons are water-cooled, by the knuckle-joint system, in which both the inlet and outlet are contained in one rocking device, the arm containing two pieces. The crank-pit is entirely inclosed and forced lubrication adopted, but liberal access is provided for by means of large doors. Generally speaking these engines follow in design the Tosi merchant-marine engine, and have cross-heads and guides.

Knowing Lord Pirrie's firm belief in the Diesel engine it is only to be expected that Harland & Wolff would utilize this class of power for every possible purpose. They have done more than that, having ordered the world's largest commercial Diesel engine as power plant for one of their shipyards and dry docks. This is a Sulzer six-cylinder motor of the two-cycle type, which has an output of 4,000 b. h. p. or 666 horse-power per cylinder.

No doubt this engine, which has been delivered, will be given a severe working; because if, as expected, this engine proves highly successful, it will mean a step nearer the 18 knot passenger motor liner. Three such engines would mean 12,000 shaft-horse-power, or 15,500 indicated h. p., which is sufficient to drive a fairly large trans-Atlantic liner at a good speed. The builders of this engine of Harland & Wolff have had in their test shop for several years a single-cylinder marine engine of 1,000 mm. bore (39 3/10") by 1,100 mm. (43 3/10") stroke from which over 2,000 b. h. p. is developed at 120-150 r. p. m. Regarding the Diesel engines at the Liverpool docks, we have unfortunately no reliable details available at the present time.



SULZER DIESEL ENGINE INSTALLED IN HARLAND AND WOLLF'S SHIPYARD

### STANDARD TAKES COAST AGENCY FOR MONARCH CARBURETER.

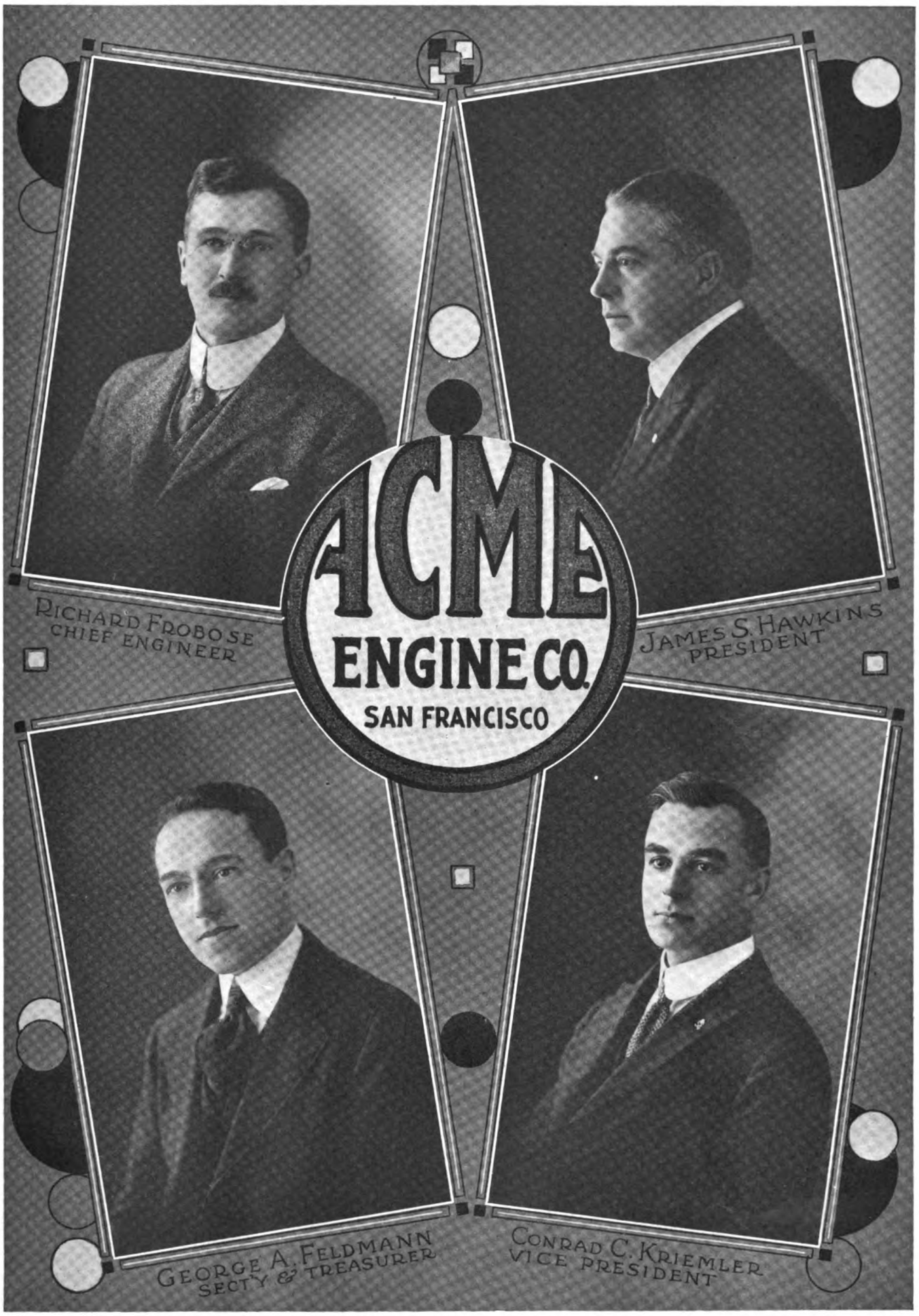
The Standard Gas Engine Co. of Oakland, Cal., manufacturers of the well-known "Frisco Standard" heavy duty gas engines, and coast distributors for the Southwark-Harris valveless oil engine, have been appointed the Sole Pacific Coast agents for the well-known Monarch carbureter manufactured by the Monarch Valve Co. of Brooklyn, N. Y.

The Standard people have been using the Monarch carbureter on the Frisco Standard engines for more than a year and have thus had a chance to put them to the utmost test and have found that they cannot be excelled for slow-speed, heavy duty engines, as they give a minimum amount of fuel consumption and operate with an equal degree of efficiency on gasoline, benzine, or No. 1 engine distillate. In addition to this they are so simple and durable in construction that they have proven the ideal carbureters for both men in small fishing boats and for the rough work of larger motor vessels.

The Monarch manufacturers will be assured of splendid distribution of their product through the Standard Gas Engine Co., which has one of the finest lists of agencies along the coast and through the Orient of any manufacturers in America. The branches at such places as Astoria, San Pedro and the agencies at many other coast points will act as distributing centers for these carbureters and a very large stock will be carried in the Oakland plant.

Dealers as well as individual purchasers who are interested in the subject of carbureters will do well to get in touch with the Standard Gas Engine Co., either through the main office or the company's nearest agents.

# The Acme Engine Company




FOUNDERS OF THE ACME ENGINE COMPANY.

THE new Acme Engine Company is headed by James S. Hawkins, formerly president of the Standard Gas Engine Company and one of the best known gas engine men on the Coast. George A. Feldman, the secretary and treasurer, though a new comer in the engine field is a business man of recognized ability. Mr. Conrad C. Kriemler as an engine salesman has gained wide popularity in this district, and Mr. Frobose has won recognition as a factory manager and as a designer of engines. The shops of the company are now in full operation with a picked crew of expert mechanics which the company asserts is the best on the Coast.

Several orders have already been booked among which may be mentioned a 65 h. p. 4-cylinder "Acme" engine to the order of the California Fish and Game Commission.

# A New Surface-Ignition Engine

A DIRECT-REVERSIBLE marine oil engine of entirely new design which in extended shop tests has given remarkably satisfactory results, has recently been completed by the Seattle Machine Works. The initial performance of this motor has quite come up to the expectations of both the designer and builder. The designer, Mr. Carl Engel, has been actively engaged in internal combustion engine construction for over nineteen years, as superintendent in a large eastern manufacturing plant, making oil engines. No name has as yet been given this engine, but for the sake of convenience in reference Motorship will call it the Engel-Johnson engine till such time as the makers christen it otherwise. The actual design of the engine is by Mr. Engel, its development has been made possible by the courage and foresight of Eric Johnson, president and manager of the Seattle Machine Works. Mr. Engel has worked out a very ambitious design of engine, eliminating unnecessary parts and embodying many new improvements. It has been his endeavor to build a simple, accessible and easily operated machine. It is direct-reversible with compressed air. The reversing mechanism is a new invention, the patent of which has been applied for and has already been installed by this company on several engines.

MR. CARL ENGEL

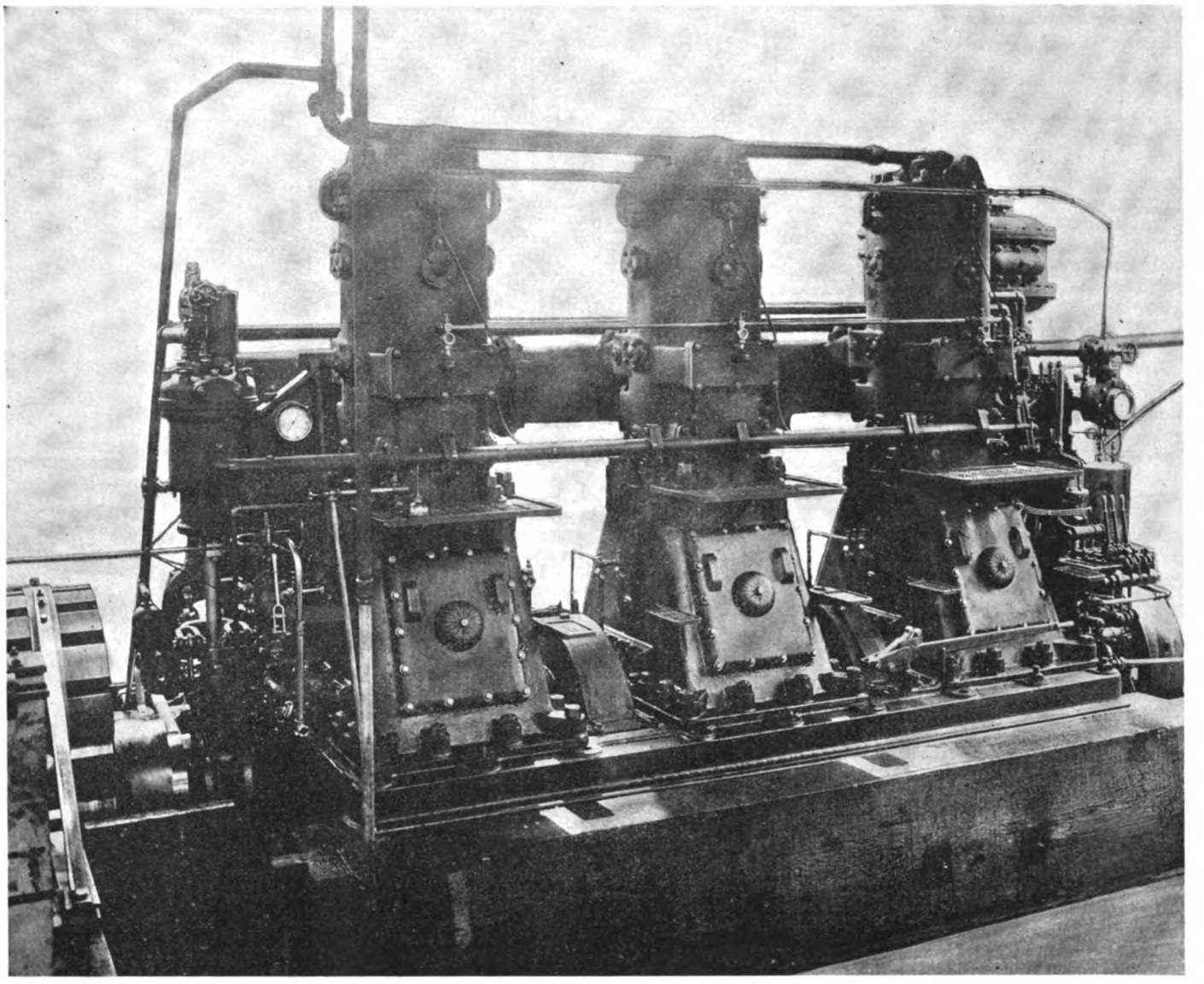
In general the Engel-Johnson motor may be said to be a two-cycle, hot-bulb marine engine in which every down stroke of the piston is a power stroke, the first model having three cylinders (the plans of the designer cover engines of powers ranging from 75 to 500 b. h. p.). The three cylinder model, designed to operate at a speed of 180 r. p. m., generates 250 b. h. p. at that speed, the engine developed this power under block test, operating under full load. It is designed to operate on fuel oil, kerosene, distillate, crude oil or alcohol, the working method being the same for each of these fuels. Mr. Engel, the designer, has attempted in this design to eliminate many mechanical difficulties that are found on other oil engines. The Engel air distributing valve is one of these and is used in starting and reversing the engine and it is used only at these times, doing away with any wear on any part connected with this valve while the engine is in motion. The fuel oil injection and the air valves are controlled by the same lever, and in starting the engine or in reversing it in either direction the lever will immediately shorten the stroke of the injection pump and gradually open the air distributing valve according to the time set for each cylinder, which will receive the full volume of air required for the engine. At the same time when the lever is set back to the center of the quadrant, the oil injection pump will resume its stroke and the engine will take the fuel oil required, according to the speed and load, which is regulated by the governor.

The cylinders of the 250 b. h. p. size are 16 inches in diameter and are of 24 inch stroke. They are unit castings and are interchangeable. The intake and exhaust ports are on the same side of the cylinder. The piston which is a one-piece casting, is fitted to the cylinder and has an allowance on the upper end for expansion according to the temperature. There are six rings to each piston which are sprung into their grooves by spreading and forcing them over the end of the piston and are held in place by a new patented locking device, which has been thoroughly tested to keep an absolutely air-tight joint for retaining a good compression. The crank shafts are hammered from solid high-carbon open-hearth steel and are finished all over; they are made oversize to Lloyd's requirements. The dimensions of the crank-pins and main bearings are such as to obtain a very large bearing surface so that the pressure per square inch is low enough to keep the bearings cool under any load which the engine may carry. Substantial counter-weights, which relieve the strain and vibration at each forward thrust, are securely fastened to the webs of each crank.

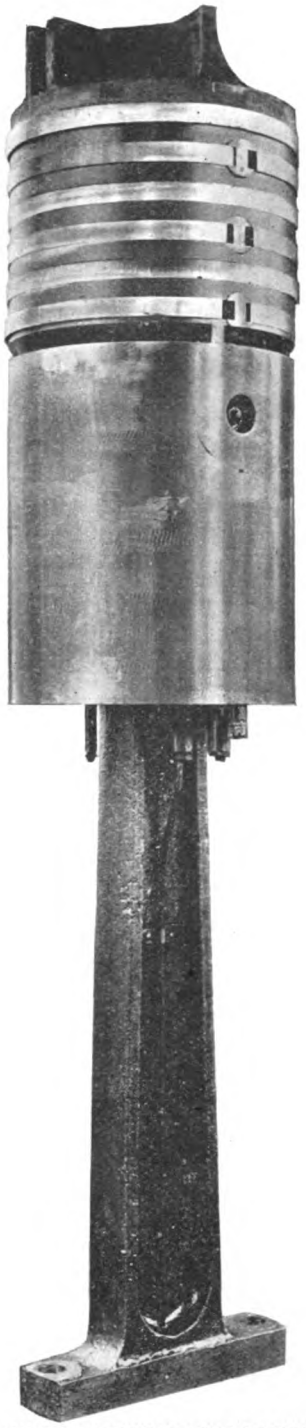
The crank bed-plate is a one piece casting and is constructed so as to take care of the crankshaft and bearings in itself. This makes possible the removing of the entire top of the engine without disturbing the crankshaft or the main bearings. The strength and construction of the crank bed-plate makes it very difficult to draw it out of line, which would cause hot bearings. It has in addition sufficient rigidity to eliminate any possibility of working itself loose from its foundation, provided that the foundation is made in proportion to the size of the crank bed-plate.

The plan of the designer of this engine has been to make the parts easily accessible. It is, according to Mr. Engel, as easy to get at the bearings or any other part of the engine as it is to reach the corresponding parts in a steam engine. The cuts shown herewith convey a fair idea of the general design of the engine. All openings leading to working parts are large enough so as to make them easy to get at. The crank-case openings are covered by flanges placed in such a position that they can readily be removed without trouble in examining the connecting-rod, crank-pins, wrist-pins and boxes. The internal dimensions and areas of the symmetrical cylinders are the result of practical experience in oil engines and are proportioned so as to obtain the greatest efficiency; they are water-jacketed and have ample water circulation from a pump which is operated from the main shaft. The water enters the base of the cylinders and is forced up to the top, where it passes out through the waste pipes and is led into the exhaust muffler or directly overboard.

For each cylinder there is an individual fuel oil pump of the simple plunger type with a self-con-

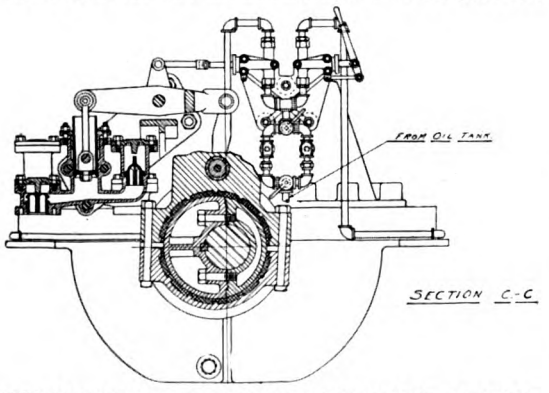


THREE-CYLINDER MODEL WHICH DEVELOPS 250 B. H. P. AT 180 R. P. M., BUILT BY SEATTLE MACHINE WORKS, SEATTLE, WASH.



PISTON SHOWING PATENTED RING LOCKING DEVICE

tained ball check. The centrifugal force of the governor weights is imparted to the rocking crank device, which is operated by an eccentric on the main shaft on which the governor slide is working, in such a manner as to cause a long or short stroke of the injection pump plunger according to the load; the displacement of fuel being in direct proportion to this variable stroke. The governor is of the centrifugal balanced type, which is unaffected by the rolling of the ship; it is driven directly from the main shaft and in conjunction




END VIEW OF BED-PLATE SHOWING WATER CIRCULATING, LUBRICATING OIL AND HAND PUMPS, ALSO SHOWING OIL FILTERS AND COMPRESSOR ECCENTRIC ATTACHED TO WATER CIRCULATING PUMP.

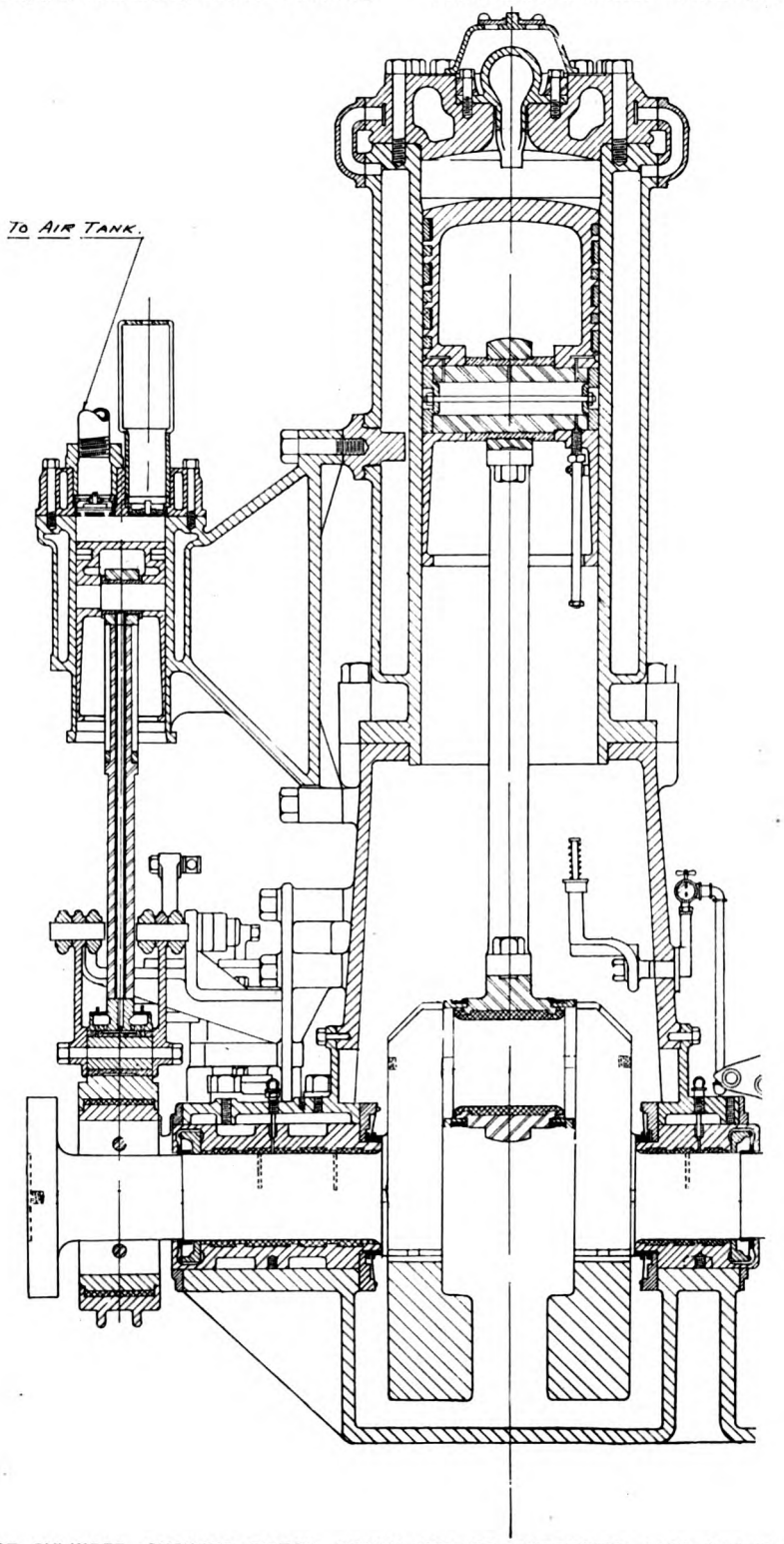
with it through a sliding arrangement with the plunger of each pump. This regulates the amount of oil injected according to the speed and load of the engine. In any case of emergency as in the loss of a propeller or in the breaking of the shaft, where the number of revolutions will be increased extraordinarily, the increased centrifugal force on the governor weights will prevent damage.

This engine has no lubricator and all copper tubes leading to the bearings or to other working parts have been done away with. The method of lubricating is one of the latest improvements and is remarkably simple in construction and also in the working. It consists of a plunger type pump, which is always in operation with the engine and which takes care of the lubricating oil which is forced through a pipe, remaining under a certain pressure against sight feeds on all the main bearings. The pressure of the lubricating oil is regulated by a by-pass valve, according to the amount of oil required for each bearing. The pressure of the oil is also indicated by a gauge which, when keeping a constant pressure, will keep the sight feed valves in proper working order. The lubricating oil for the piston, crank-pin, wrist-pin and cylinders is also forced in by a small plunger pump attached to the inner wall on each crankcase and is also regulated by a single sight-feed valve which is connected through a pipe to the same pump that supplies oil to the main bearings. In addition to this lubricating arrangement, a small hand pump is attached close to the pump mentioned above; this can be used immediately in case of any emergency, or when oil is required on the bearings when the engine is not running. This is a great advantage for the operator and does away with oil cans which often are not at hand when they are needed.

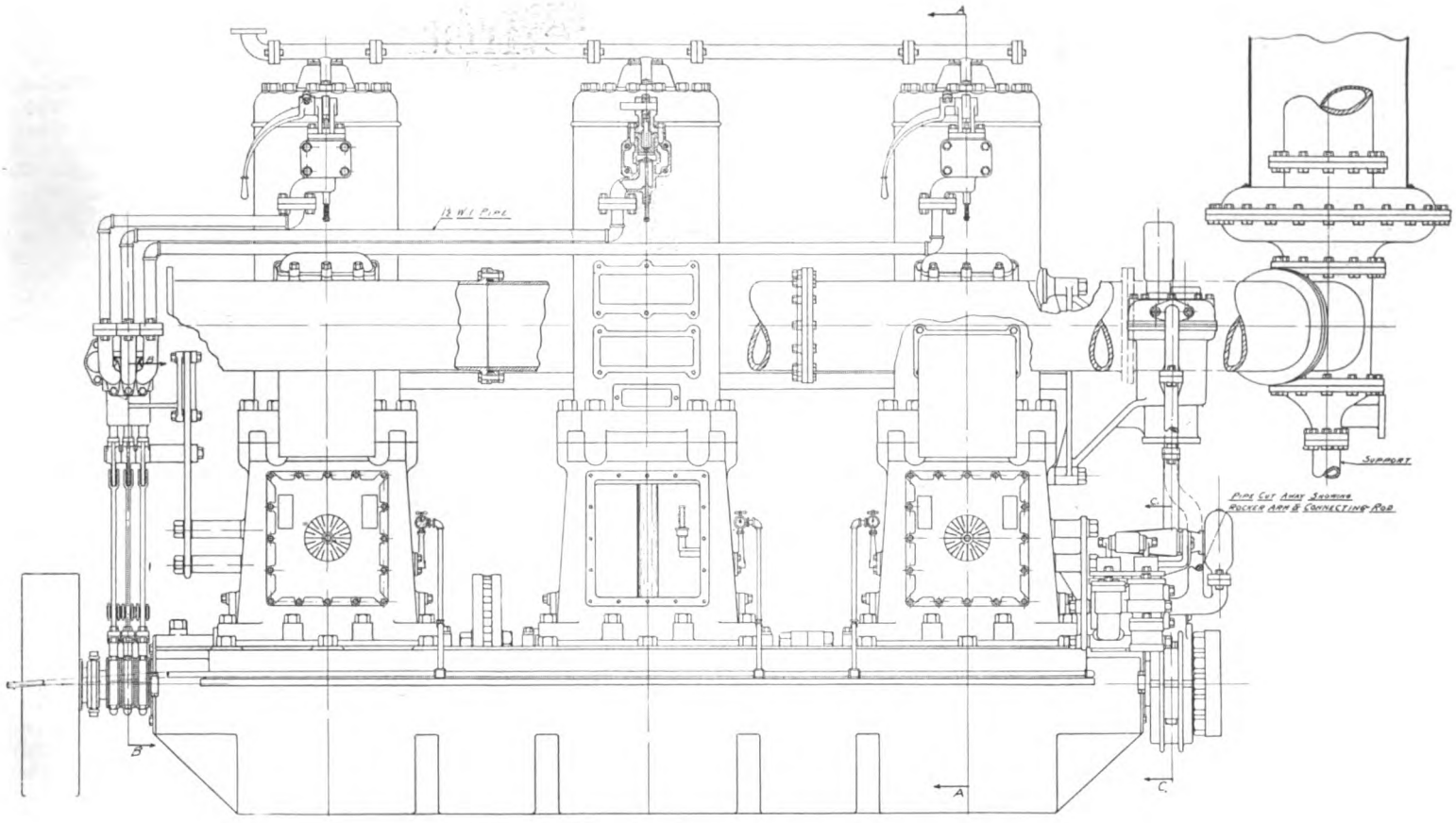
In order to prove the development of the power rated a test has been made covering a period of three months. The fuel oil consumption shows at a brake test of 250 h. p. and at 180 r. p. m. six-tenths lbs. per horse-power hour. During the test the engine was subjected to an overload of fifteen per cent; the 16 inch bore by 24 inch stroke giving a piston speed of 720 feet per minute.

The Seattle Machine Works have in the course of construction a plant to be used in the building of this engine. It will be 75 feet wide and 200 feet long and will be so constructed as to handle this engine in larger powers.

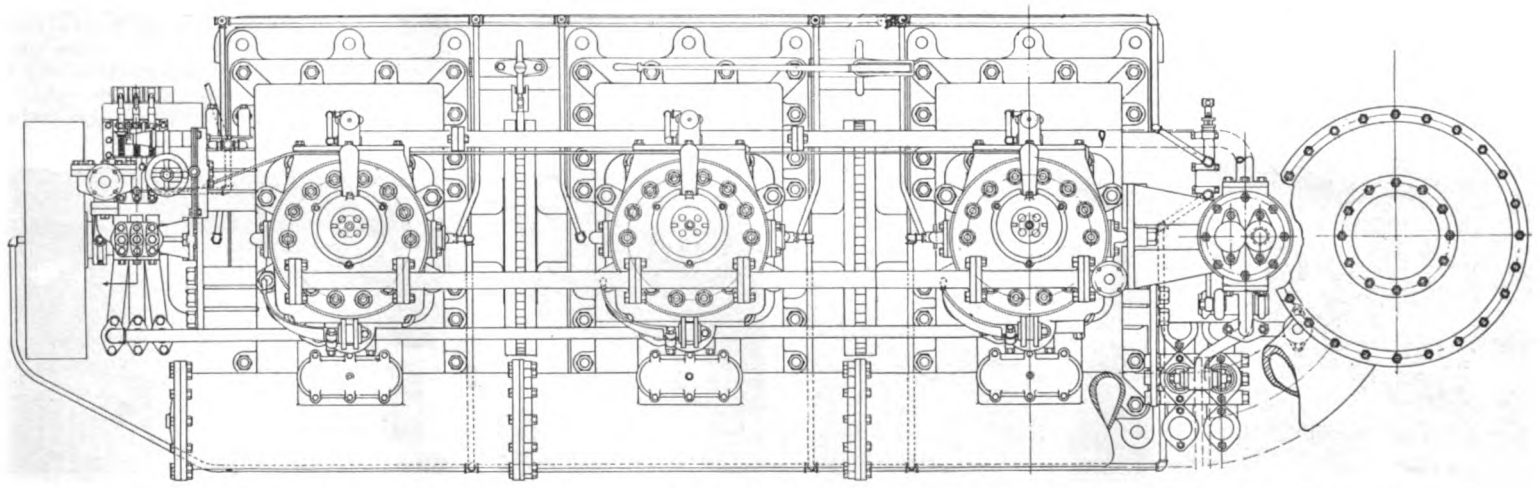
Mr. Johnson, the owner and manager, is a practical machinist who understands every feature of the manufacture of engines of all types. For this reason he has risen to a high rank in marine steam engine construction. Since the introduction of the heavy oil engine he has taken great interest in it and became convinced that it is the power of the future. An admirable opportunity presented itself to ally his own enthusiasm and his manufacturing facilities with the genius and specialized knowledge of the designer and in this way the Engel-Johnson motor was brought about.




CROSS-SECTION OF CYLINDER, SHOWING PISTON, CRANK AND AIR-COMPRESSOR, ALSO SHOWING LUBRICATING PUMP FOR WRISTPIN AND PISTON




EXHAUST SIDE OF ENGINE SHOWING AIR CHECK VALVES AND RELIEF VALVE



TOP VIEW, SHOWING CYLINDER HEADS, EXHAUST ARRANGEMENT, AIR-COMPRESSOR HEADS, WATER PUMPS AND AIR DISTRIBUTING VALVE

(Designs illustrating article on pages 13 and 14.)

## OPERATION OF THE M. S. "CALIFORNIA"

### Has Cost in Repairs Less Than Any Steamship.

ONE of the most consistent visitors to American ports during the past four years has been the steel-built Diesel-driven motorship "California," owned by the United Steamship Co., of Copenhagen, Denmark, a 9,000 tons d. w. c. Diesel vessel built by Burmeister & Wain, which has been trading in the heart of the war zone since the war started. She is known as the champion submarine-dodger of the North Atlantic.

When the steamship "California" of the Anchor Line was torpedoed off the Irish coast, the motorship "California" was in the vicinity and the report flashed broadcast to North Atlantic ports that she had at last been caught.

Her owners in Copenhagen and her agents here, although the last to believe that their Diesel-driven blockade runner had been finally trapped, were about to concede her loss when word came from abroad that she had motored blithely into a certain port and was safe and altogether sound.

The "California" established beyond all doubt the great advantages of motor propulsion for seagoing ships. She has been in continuous service for four years, and, according to her owners, has given less trouble and has cost less in repairs than any vessel they ever owned or heard of. Her owners were so thoroughly impressed with her performance after being put into service that they ordered a sister ship. This vessel is now in commission and is known as the "Oregon," which also has a fine record.

Although she has space for nearly 9,000 tons of cargo, the "California" also has luxurious accommodations for about sixty passengers. There is a beautifully appointed first-cabin dining-saloon just aft of the bridge and there is a section set apart for a few second cabin passengers. She is 415 feet long, 56 feet beam and 35 feet depth of hold. The engines are in two separate units of eight cylinders each, driving twin-screws. The plant develops 2,600 horse-power, yet there are only twelve men in the entire engine-room crew and no stokers.

Nine hundred tons of fuel oil are carried in the ship's double bottom and the average consumption per day is nine tons (63 barrels). She shows a sustained speed of eleven knots and can add considerably to this when pushed.

Members of the motorship's crew say that in the heaviest weather she has proved herself wonderfully seaworthy and steady.

Hence it is no wonder that in future her owners will build no more steamers, but will confine themselves to ordering big motorships.

## NEW ITALIAN MARINE INSURANCE COMPANY.

The arrangements for the establishment of an important and influential new insurance company, to be called "Il Mare," have been successfully carried through, and the above company is now formally constituted, with its registered address at 36, Via XX Settembre, Genoa. The following gentlemen, among others, will be on the board of directors: Cav. Giovanni Agnelli, director of the "Fiat"; Cav. Giuseppe Boselli, of the "Fiat S. Giorgia" company; and Signor Leo Rigoletti Gays, all being well known in the insurance world, and under their guidance the success of the new enterprise may be considered as assured.

## MOTOR BARGES FOR STANDARD TRANSPORTATION CO.

Two 650 tons (gross) tank barges are shortly to be converted to motor power by the Standard Transportation company, of New York, which is one of the subsidaries of the Standard Oil company, and possibly other barges will be converted later. The S. O. barge No. 62, has been running since November, 1915, with her present 320 b. h. p. Bolinder oil engine, giving very good service. This vessel is of 850 tons gross, and can carry 10,000 barrels of oil cargo, or roughly 1,450 tons of oil. Her speed light is 9 knots, or 6½ knots loaded.

# First Winton Diesel Engine Installation

THE first installation to be made of the Winton marine oil engine has been completed in the motor auxiliary "Esperanca" recently launched from the yards of the Peninsula Shipbuilding Company, Portland, Ore. This vessel is built along the general lines adopted by builders of this region with the addition of minor details specified by the owners to fulfill Norwegian regulations. The installation of these motors and their subsequent trials have been watched by all who are interested in this type of vessel and particularly by Alexander Winton, president of the Winton Engine Works, who was pleased by their satisfactory performance. Mr. Winton made a special trip to Portland from Cleveland, Ohio, to supervise the installation and trials.

The "Esperanca" is a four-masted motor schooner of the bald-headed type having a full main deck, a forecastle deck 58′ long (carried on a line with the top of the main bulwarks) and a raised poop deck 42′ long. Her dimensions are as follows: Length over all 255′, length of keel 225′, moulded depth 21′ 6″, depth of hold 19′ 4″, approximate deadweight capacity 2300 tons on a loaded draught of 20′, hold capacity of 123,500 cubic feet. This vessel, unlike other vessels of this class, has only two cargo hatches 14′x24′, which are located between masts number one and number two, and between three and four. The machinery is located at the after end of the vessel and is separated from the hold by a watertight bulkhead. The hull is built and equipped to classification Lloyd's Register and to the requirements of the Norwegian government. The forecastle contains the quarters for the crew, with their messroom and pantry, paint room, stores and crew's toilet. The quarters for the officers and the engineer are housed under the poop deck with their messroom and galley. The wheel house is located on the poop deck and has a companionway aft and inside leading to the quarters below.

The steering gear is of the usual hand type and was supplied by the Hesse-Martin Company of Portland. One life boat and a work boat are carried in davits on the poop deck.

**Deck Machinery.**

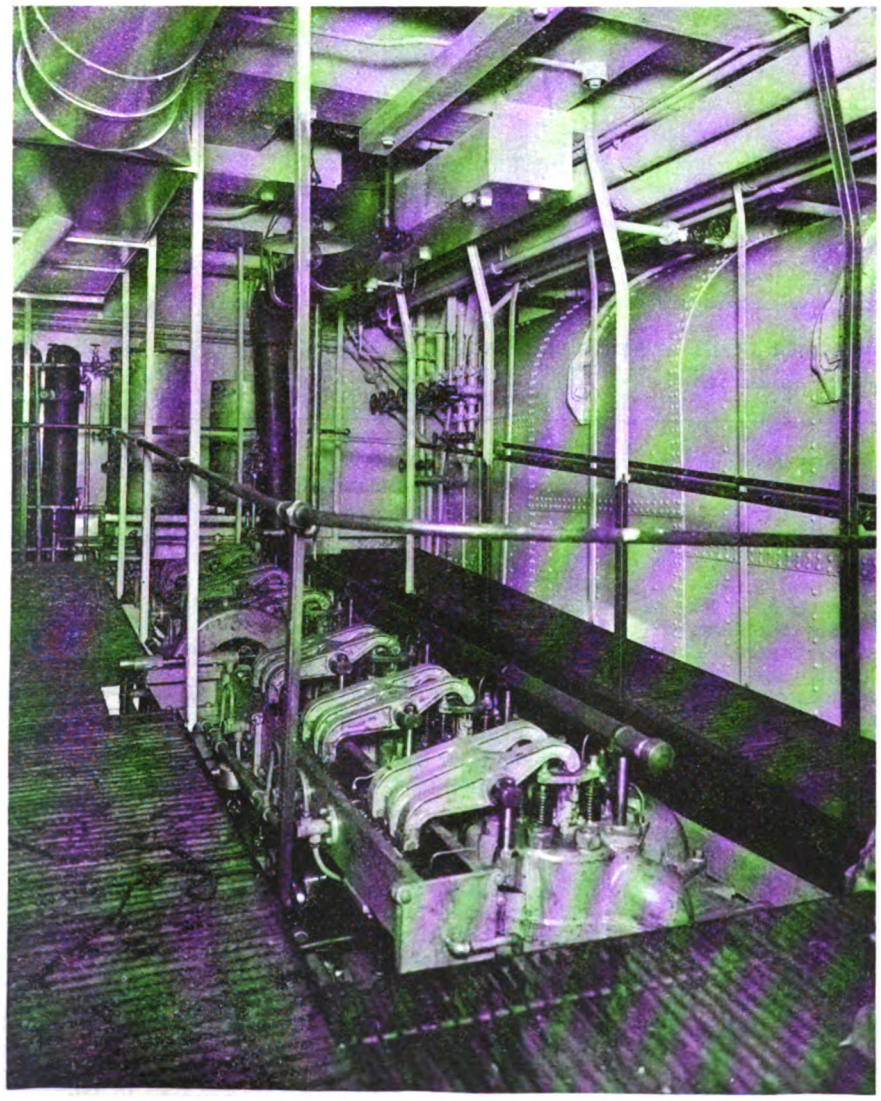
The deck machinery was also supplied by the Hesse-Martin Company and includes a double

ALEXANDER WINTON,
President Winton Engine Works.
Mr. Winton supervised the installation of the engines of the "Esperanca."

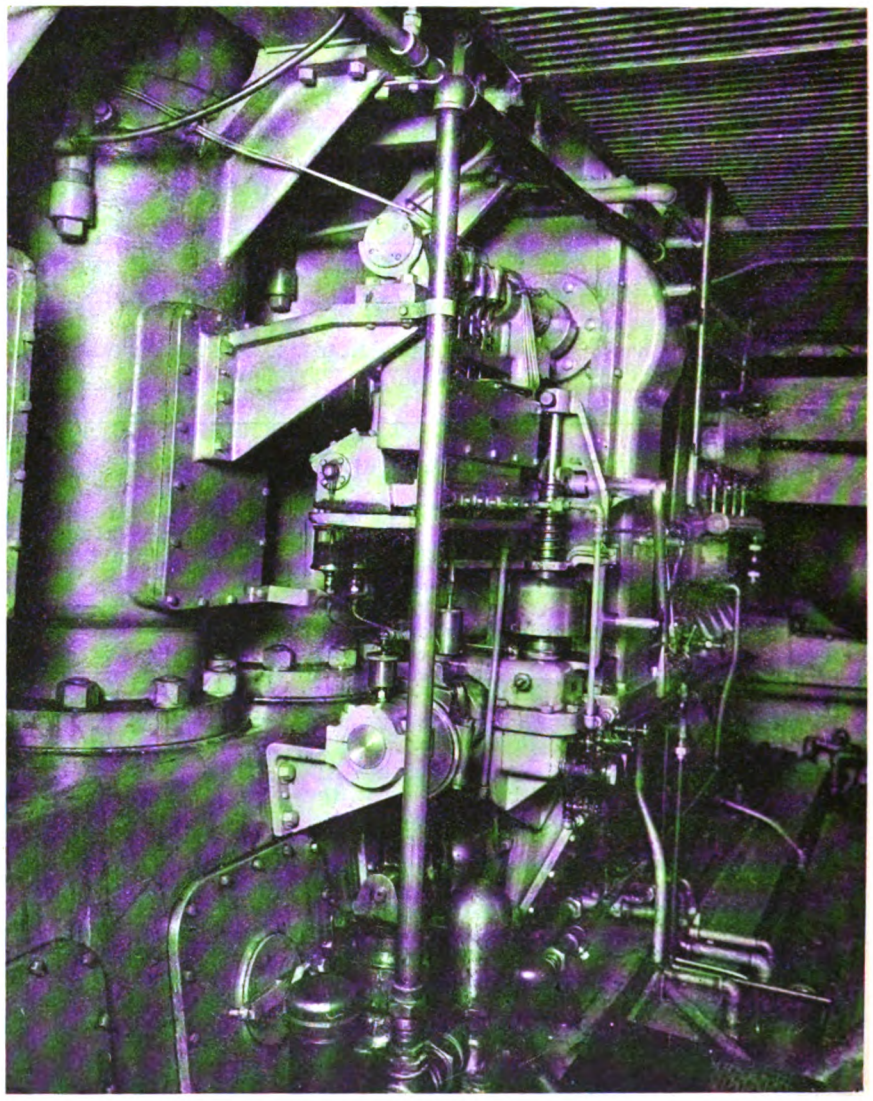
cylinder (10″x10″) windlass. There are also a pair of single cargo winches on the forecastle deck and a pair on the poop deck. These are also of the double cylinder type (8″x8″). The steam for the winches, windlass, auxiliary compressor bilge and main fire pump is supplied by a vertical tubular boiler 10′ 6″x6″, situated inside the forecastle house on the starboard side. Where the boiler extends above the head of the forecastle deck, it is housed in with a steel hood. The boiler was built by the Eureka Boiler Works of San Francisco. It has a heating surface of 1100 sq. ft., and a working pressure of 150 pounds. The cargo is handled by a pair of booms and also by two ports located in the bow. The booms are each 45 feet long and are located one on the after side of the foremast and the other on the forward side of the mainmast.

**Engines and Engine Room Auxiliaries.**

The engines are of the four-cycle type, each having six cylinders (12-15/16″x18″). They are designed to develop 350 b. h. p. at 210 r. p. m. and to swing propellers 7 feet in diameter with a 5 foot pitch. The engines are built to the requirements of Lloyd's register. They are direct reversible (this being effected by means of sliding cam shafts). Each cylinder has two inlet and two exhaust valves. The compressors on the engines are two stage and are gear driven. The air for starting and for the fuel injection is carried in steel bottles which are charged to a pressure of 1000 pounds, but are reduced to 600 pounds for ordinary working pressure. The auxiliary compressor is two stage, driven by a two-cylinder steam engine made by the Troy Engine Company. The tanks for the lubricating oil will contain 1740 gallons. The oil is pumped through separate oil filters for each engine and from the filters it passes through oil coolers to pumps on the main engine which deliver the oil to the lubricating system under a pressure of 10 pounds. The fuel for the main engines is carried in seven tanks with a total capacity of 1500 barrels. Two of these are gravity tanks located in the after end of the engine room above the engine platform. Two tanks are located in the wings of the engine room, two in the hold forward of the engine room forward bulkhead and one is on the main deck

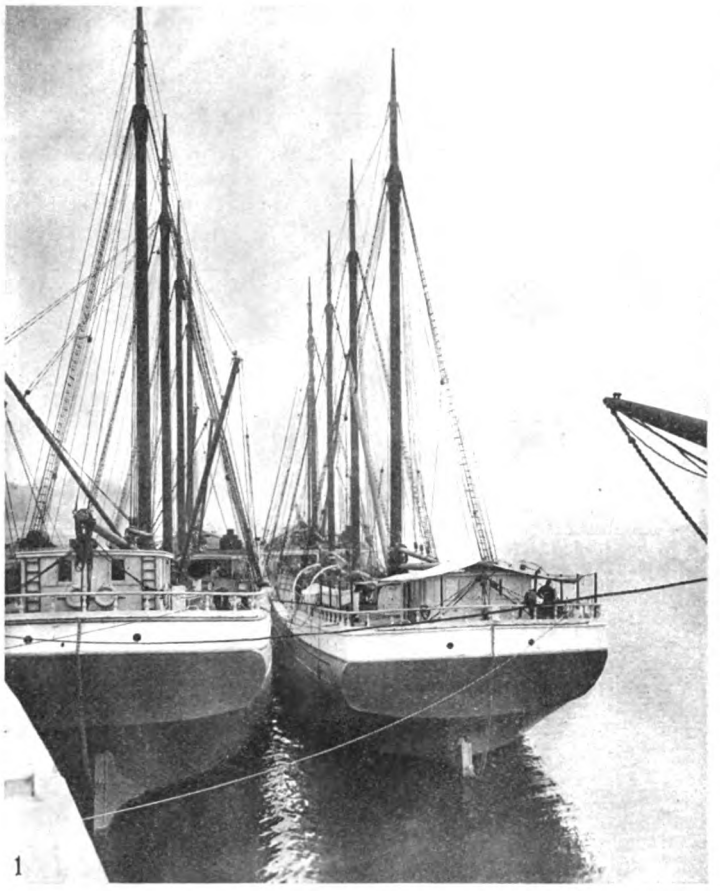


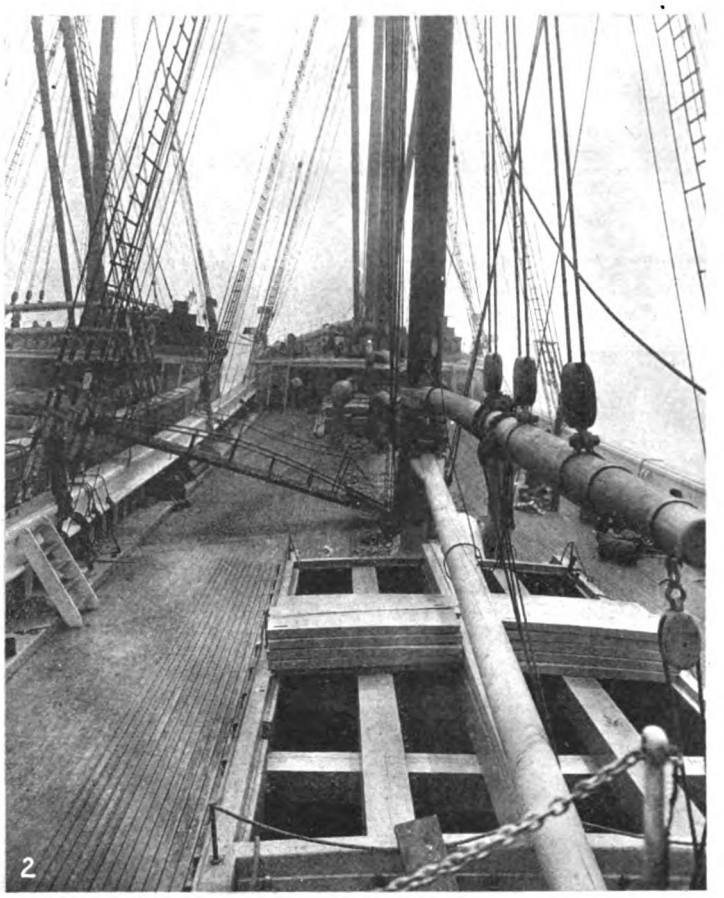
STARBOARD ENGINE ROOM PLATFORM OF M. A. "ESPERANCA" LOOKING FORWARD.

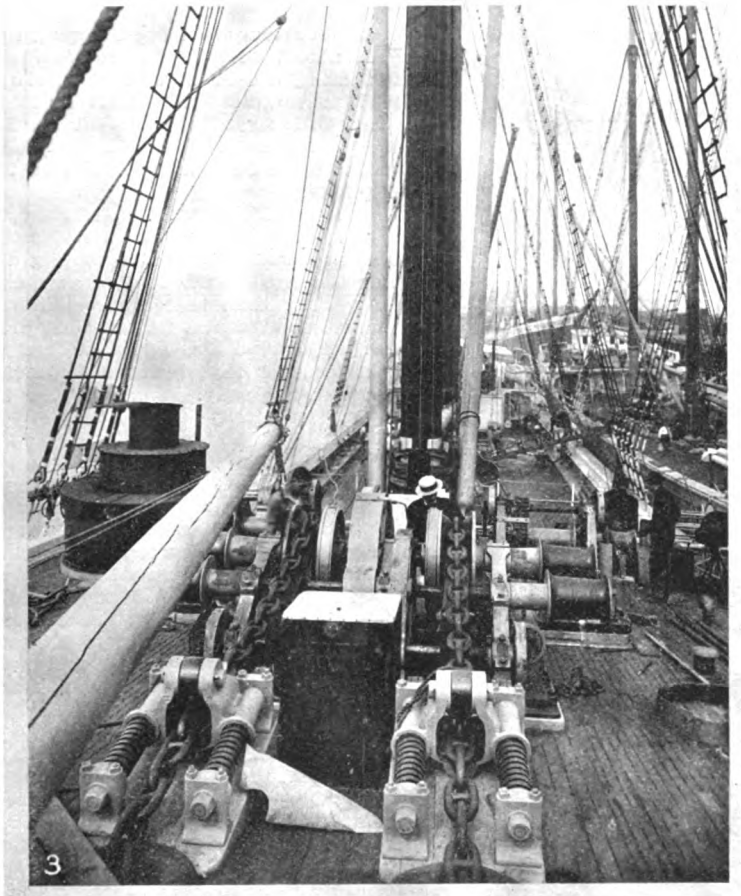


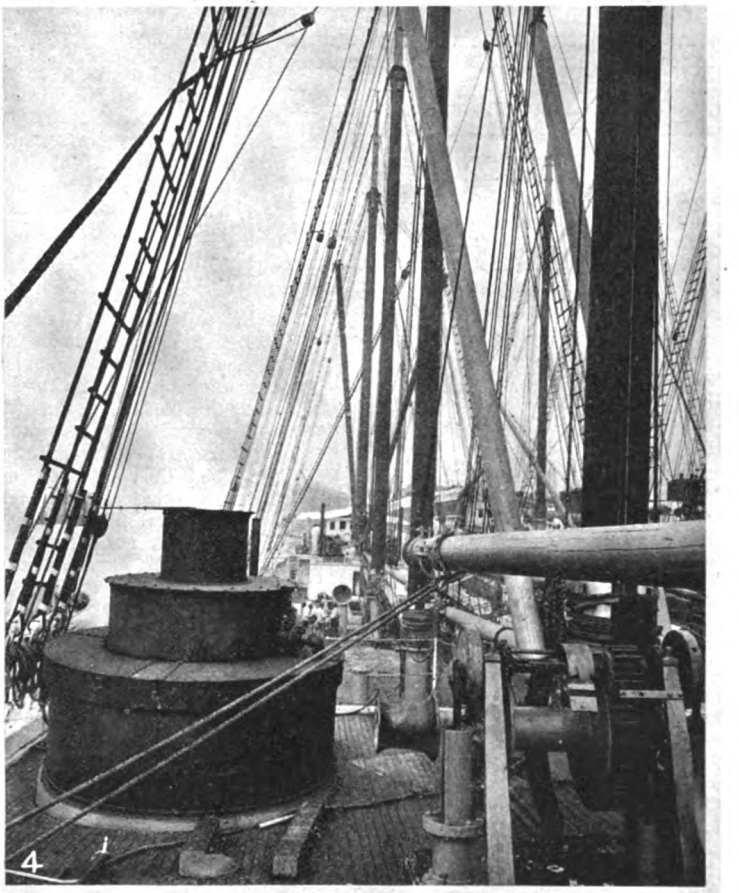
OPERATING SIDE OF STARBOARD ENGINE OF M. A. "ESPERANCA" LOOKING AFT.

forward of the poop deck. All the fuel is pumped to the gravity tanks before feeding the main engines. In addition to the main fuel tanks there is a tank with a capacity of 120 gallons situated on the forecastle deck on the port side, for the donkey boiler. The bilge and fire pumps are located in the engine room and are arranged to work with either steam or air. They are of the Venn Severin Company of Chicago. The engine room is well ventilated by means of two large Cowl ventilators on the poop deck with air ducts leading to various parts of the engine room below. There is in addition a forced draught ventilator run by a ¼ h. p. motor fan. The engine room casing extends from the main to the poop deck with a large skylight above. A special possibility of oil getting into the bilge. This is in compliance with Norwegian regulations. All sea suctions are to be fitted with strainers on the outside of the valves. The exhaust from the main engine is well muffled, the pipes leading about ten feet above the top of the poop deck. The air suction on the main engine is efficiently muffled.









1. STERN VIEW OF "ESPERANCA," AND "IRIS" (ON THE LEFT), WHICH IS ALSO TO BE EQUIPPED WITH WINTON DIESELS.
2. VIEW OF MAIN DECK SHOWING CARGO HATCHES OF "ESPERANCA."
3. VIEW FROM THE FORECASTLE OF "ESPERANCA" LOOKING AFT. HESSE-MARTIN WINDLASS IN FOREGROUND.
4. VIEW FROM FORECASTLE OF "ESPERANCA" LOOKING AFT AT HOOD OVER DONKEY BOILERS.

Fairbanks Morse pattern with four inch suction. (Two hand bilge pumps are on deck). The vessel is lighted by means of a 5 K. W. direct connected generating set operated by a single cylinder surface ignition engine manufactured by feature of the installation is the manner in which all woodwork in the engine room is lined with sheet metal; the sides and the floor of the engine space and the engine pits are lined in the same manner with suitable drainage to prevent any

Power and speed with a minimum of rough running have been the aims of the designer and builders. With the Winton oil engine installed these things have been met in a most successful way.

# MOTORSHIP

A journal devoted exclusively to Commercial Motor Vessels and their operation. Issued on the 25th of each month.

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## THE URGENT NEED FOR TANKSHIPS.

### Oil a Vital Factor of Ultimate Victory.

WHEN Lloyd George said that victory was spelled in three words,—ships—ships—and ships,—he should have added the prefix "tank" to at least two of these words; for, if immediate steps are not taken to provide a large number of new tankships a critical situation will arise in Western Europe within eighteen months. But, this can be avoided if instant steps are taken by Washington.

It is not hard to discover a reason for German diplomats' light treatment of America's magnificent plans for building an enormous cargo fleet. It only is necessary to follow the recent U-boat policy, inasmuch oil-carrying tankers are receiving special attention, both from submarines and plotters, with the result that quite a number of vessels of this class are at the bottom of the ocean. That the tanker situation is becoming most serious was openly stated quite recently in the House of Commons by a member of the British Government.

Oil is a vital factor of ultimate victory, because gasoline, crude-oil, and lubricating-oil are among the most important adjuncts to the allied armies and navies, and without a proper supply modern warfare operations would be at a standstill.

Now that the Rumanian oil-fields are in the hands of the Central Powers, and that oil cannot be shipped in any quantity from Russia to the Allies, and because the supply of Scottish shale oil is limited, as is the supply of benzole (a by-product of coal), both the Allies' and our own requirements in Europe are almost entirely dependent upon oil transported across the Atlantic or through the Mediterranean Sea from the Far East, which are submarine-infested waters.

No doubt Germany — relying upon her recent actions—now fully realizes that if she can stop the majority of oil-carrying vessels reaching Europe it is really comparatively unimportant if food and ammunition ships do get by her submarines, for Great Britain and France now can produce sufficient food to prevent actual starvation, but not enough oil to satisfactorily operate their fleets and armies.

Consequently if we do not foil Germany's intentions it will put her in a position to dictate her own terms before another year-and-a-half is out,—a thing too awful to contemplate in idleness.

It is well to send over twenty thousand aeroplanes for blowing up the submarine bases; but, aeroplanes cannot fly without gasoline, nor can the sea-chasers chase without fuel.

We have to supply the torpedo-boat-destroyers; many of the ships-of-the-line; aeroplanes; seaplanes; trucks; gun-tractors; "tanks"; motor-boats; dispatch-boats; motor-cycles; "blimps"; officers' automobiles; submarines; supply and ammunition hauling vehicles; coastal-patrol craft; ploughs, and so forth.

All these require an enormous supply of liquid fuel apart from lubricants. Without a steady replenishment of the stocks the Allied armies and navies would be in a very sorry position in a year.

Considering the enormous supplies of oil now required in Europe, what will be the amount when the United States sends over a million men, most of the twenty-two thousand lorries just ordered, twenty thousand aeroplanes, three hundred and forty 660 b. h. p. submarine-chasers, and another twenty-five T. B. destroyers?

That there are not enough tankers in service or building in this country is fairly evident. Only today the Navy has been obliged to commandeer six large tankships from private owners. We must remember that each T. B. destroyer needs from eight to ten tons of crude-oil fuel per hour, according to the cruising speed in the U-boat district. There are building for our Navy about thirty new destroyers and many more will soon be ordered, while each of the 340 submarine-chasers will need from five to seven tons of gasoline per day.

The minimum amount of liquid fuel that will be required each month by the American army and naval expeditionary forces is easy to roughly and conservatively calculate. As a minimum we can reasonably assume that each power unit, whether boat, truck, or aeroplane, will operate for half the number of hours in a month, namely, 360 hours, which gives the following monthly total consumption of fuel alone:

| | | | |
|---|---|---|---|
| 40 Destroyers ..... | 110,000 | to | 130,000 tons |
| 340 Chasers ..... | 28,900 | to | 35,700 tons |
| 20,000 Aeroplanes ..... | 180,000 | tons | (about) |
| 22,000 Lorries and autos, etc..... | 99,000 | tons | (about) |
| 1,100 Ambulances ..... | 1,000 | tons | (about) |
| Monthly total ..... | 418,900 | to | 445,700 tons |

Allowing a reserve for countless other motor-driven units, it means that a minimum of at least half-a-million tons of crude-oil and gasoline must be shipped each month for the American forces alone, while the Allies require about a similar amount, as in America's total no fuel for big oil-burning battleships and cruisers if such are sent to European waters, as they no doubt eventually will be, is included.

To maintain the above fuel supply for the American contingent (lubricating-oil can be carried as case-oil in ordinary steel-built ships) no fewer than seventy-five (75) tankships each of 10,000 tons cargo capacity, or 11,000 tons d. w. c. if steam-driven, must be in regular service in about fourteen months from now, each vessel making nine return voyages per year. This apart from our Allies' enormous needs and without allowing for any sinkings.

On the other hand 200 steel-built triple-screw chasers of large size and high-speed, each equipped with three 500 b. h. p. submarine four-cycle Diesel engines will only need a maximum of 750 lbs. per hour per boat, or a total of 48,000 tons per 30 day month, while double the number of chasers will be in service.

This gives a total saving in transportation of oil-fuel of about 672,000 tons per month, or nearly one hundred 8,000-ton tankships in regular service between the United States and Europe.

We strongly advise the Navy Department to do a little careful calculation.

Eventually the Navy Department will be obliged to follow the suggestion that we have put forward; but let the work be done before it is too late! Let us call the new class of vessel —Submarine-Destroyers!

Endorsement of the opinion expressed comes in a statement recently made by M. Henry Berenger, a Senator of France, who claims that France's demand for gasoline is 50,000 tons per month, and that there is a shortage in the supply of 20,000 tons, or nearly half the amount, due to the shortage of tonnage and tank vessels. Furthermore, Rear-Admiral Bradley A. Fiske has stated that "the oil supply of the British Fleet is so seriously menaced that the use of her newest vessels is threatened."

Further confirmation of the opinions expressed is to be found in a recent statement by Lord Northcliffe in the North American of Philadelphia (made since this article was written) as follows:

"Oil can be safely carried only in tankers. Your newspapers continually announce the sinking of oil tankers.

"Now, of tankers there is only a limited supply in the world, and that supply is decreasing. In short, while the demand for tonnage is increasing the supply is decreasing and at a rate that makes all thoughtful people anxious."

Incidentally Lord Northcliffe states that 500 to 600 small destroyers would render an Atlantic lane comfortably safe. He also states that Great Britain has some three thousand vessels engaged in anti-submarine warfare. We advise that such destroyers be submarine-Diesel engine driven.

## DIFFICULTY IN OBTAINING HARDWOOD FOR WOODEN SHIPBUILDING ON PACIFIC COAST.

Owing to their great strength and lasting properties, New South Wales hardwoods are particularly suitable for shipbuilding. These woods have been used for years in the construction of river coasters in Australia on account of their great adaptability to rough usage. Many of the coastal rivers have bad sand bars, and the continual bumping when the vessels are crossing is a severe trial. Nevertheless many coasters have been running continuously for periods of 20 to 30 years and are still fit for service. The harbor ferry service of Sydney, which is very extensive, is carried on mostly by wooden steamers, and preference is given to wood over steel because it is better able to stand the strain of continual bumping. These vessels are 200 to 300 feet long.

On account of their hardness New South Wales timbers are not so liable to damage by marine insects as softwoods, and frequently hulls are planked to the waterline with hardwoods and the top sides finished with softwoods. Grown timber suitable for knees, crooks, and frames can be supplied in large quantities. Timbers for small boats are now cut out of spotted gum, and this timber is now universally used where previously hickory and elm had to be imported. It is more lasting and bends just as readily when steamed.

Considerable quantities of timber suitable for keels have been shipped to the Pacific Coast of North America during the last few years and the trade has been growing, especially since the shipbuilding program was launched in the United States. Of late, however, American importers of these woods have complained that it is impossible to obtain them as it is impossible to obtain space on boats sailing from Australia because ships have been commandeered by the Australian government. In view of this Motorship wired the Department of State in regards to this matter and urged that it be brought before the British Ambassador and also urged that the representatives of the State Department in Australia be instructed to make the proper representations regarding such shipments as may be ordered by contractors to the United States government. In reply the Department of State stated that the telegram was receiving its consideration and had requested the comment of the Shipping Board prior to sending instructions to the American Consul General at Sydney.

## MOTORSHIPS AND THE U-BOATS.

The motorship "Hamlet," which was at Phildelphia recently, afforded widespread interest from shipbuilders, and the record of seven voyages made in eleven months by this vessel through the war zone without sighting a periscope, has attracted the attention of the Shipping Board. It is also of note that not one motorship has as yet been sunk by a U-boat. The "Hamlet's" immunity from U-boat attacks is attributed to her Diesel engines, which send out no telltale smoke to announce her location; also, her machinery does not make noise enough to register on the U-boat's microphone.

The "Hamlet" is owned in Norway, is of 7,000 tons and her chief engineer is responsible for the statement that the cost of operating a steamship of her tonnage would be just two and one-half times greater than that of the motorship, while her master states that he has seen the "Hamlet" averaging eight to nine knots an hour for days on end in weather that reduced steamers her size to bare steerageway. That's where the adaptability and pliability of the ship's power plant comes in.

There seems to be no question that when normal trade conditions again prevail the motorship will be an important factor in ocean transportation. This type of vessel is being rapidly developed in Germany, the home of its origin, and some surprises in motorships may be looked for in after the war revelations. That Germany has unlimited confidence in the future of the Diesel engine as a means of ship propulsion is indicated by the fact that the great Imperator motor works near Hamburg are now in full swing manufacturing ship motors.—Marine Journal.

## BURNING OF "R. P. RITHET."

The old "R. P. Rithet," formerly one of the sailing packets in the San Francisco-Hawaiian Islands trade, and lately turned into a motorship was burned at sea, July 15th, on the way to her home port from Makukona. At 3 a. m. on that date, fire was discovered in the engine room, and though for seven hours all hands gallantly fought the flames, the task of subduing them was found impossible. Taking to the lifeboat the crew of twelve, under charge of Capt. K. W. Lindberg navigated the little craft for ten days until the island of Kauai was reached. The "Rithet" was owned by the Matson Navigation Co., and carried a cargo of 1700 tons of sugar. Before her conversion into a motorship, the "Rithet" was a handsome bark plying in the Hawaiian trade, making fast voyages, and was, at one time, well-appointed for carrying passengers.